Bath, Whirlpool

NSN 6530-01-128-2442

Contract DLA 120-89-C-8515

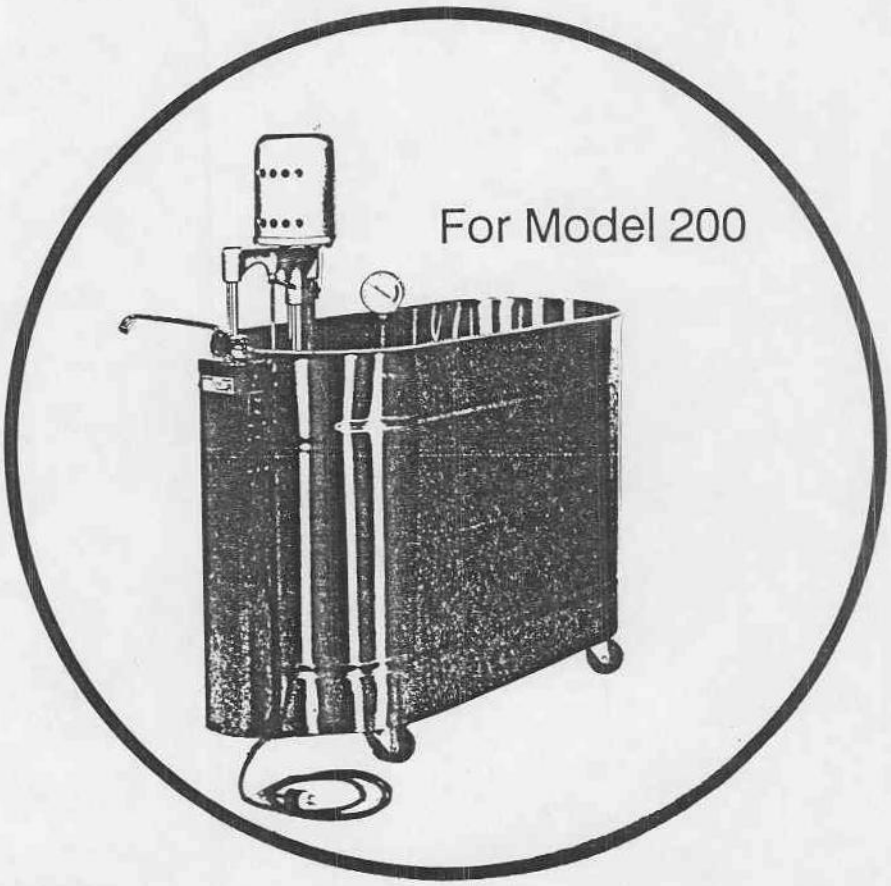
Federal Supply Code 16835

FERNO

IIIe

Mobile
Hydrotherapy
Unit

Operation,
Service and
Repair Parts
Manual



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Section 2: Equipment Data and Drawings

2.1 Introduction

2.1.1 Model 200 Mobile Hydrotherapy Tank

Length: 36″ (91.4 cm)
Width: 22″ (55.9 cm)
Depth: 28″ (71 cm)
Height: 37″ (94 cm)
Capacity: 72 gal (272 liters)
Shipping weight: 233 lbs (106 Kgs)

The Model 200 Mobile Hydrotherapy Tank is designed to be used for arm, hip and leg treatments. These units are ideal for physicians' offices, physical therapy, sports medicine clinics and podiatrists. This unit is fabricated of AISI type 304 stainless steel for increased corrosion resistance. The ball bearing casters allow the whirlpool to be moved smoothly and easily to the water supply. The heater provides maintenance of water temperature. The drainage pump is powered by a separate motor. No floor drain is needed. The system includes a swing arm located at wash basin level and an auxiliary floor drain valve assures complete emptying.

2.1.2 U.L. Listed Current Model Number 200

Ille Hydrotherapy Units are Underwriters' Laboratories listed. Accordingly, they will conform to the U.L. "Standards for Safety—Medical and Dental Equipment" (UL 544—October 24, 1986), and are classified as "Patient Care Equipment".

UL Definition of "Patient Care Equipment"

"Equipment that is intended to be used on or with, or likely to be contacted by, a patient in a health care facility in the course of his treatment".

"Patient care", grounded equipment is permitted to have a maximum leakage of 100 microamperes to ground.

WARNING

Hydrotherapy units are not intended for use with "electrically susceptible patients".

FAILURE TO HEED WARNING MAY RESULT IN INJURY.

UL definition of "Electrically Susceptible Patients"

"A patient being treated with an externalized electrically conductive device (for example, a probe or catheter) indwelling or implanted and terminating on or in the heart".

This equipment is intended only for professional use where the patient will be under the supervision of trained personnel.

For safe operation, unit must be properly grounded.

WARNING

Unit should not be operated unless connected through a ground fault interrupter and a 30 minute maximum timer—located in an area unreachable to the user in the unit.

FAILURE TO HEED WARNING MAY RESULT IN INJURY.

CAUTION

Mobile whirlpools must be used on level floors. Improper use may result in injury to patients or personnel.

2.2 Electrical Characteristics

Ille Mobile Hydrotherapy Units are available with the following electrical characteristics:

115 Volts—60 Hertz—AC
230 Volts—60 Hertz—AC
115 Volts—50 Hertz—AC
230 Volts—50 Hertz—AC

Note: Since each electrical characteristic requires matching components, you must order a hydrotherapy unit to match your power supply. 115 Volt—60 Hertz units are supplied as standard.

1. Unit Rating 115 Volts, 60 Hertz or 50 Hertz, AC

Model	Rating Amperes
200	14.0

Ground fault circuit interrupter plugs have been installed on all mobile units, with supply voltage of 120 Volts AC, 60 Hertz, 15 amp and 20 amp circuits.

Specifications

Supply Voltage: 120 (+10, −15) VAC, 60 Hz
Ratings: GF-15P 15A., 120 VAC
GF-20P 20A., 120 VAC
Configurations: GF-15P NEMA 5-15P
GF-20P NEMA 5-20P
Operating Temp.: −35°C (−30°F) to 66°C (150°F)
Trip Threshold: 5 ± 1 mA.
Trip Time: 0.025 sec. nom. per UL Standard
Case Material: Nylon
Dimensions: L. 6.50″, Ht. 2.82″, W. 1.75″
Cord Type: AWG 14/3 or 12/3, SJ, SJO, SJT, SJTO, S, SO, STO, SEO, SJEO.
Cord Grip Range: .360 - .655″
UL Listed: Class A Portable

Units requiring 15 amp GFC1
Models: 200, 201, 276, 281, 286, 291, 305, 306, 400, 401

CAUTION

Incorrect current supply will seriously damage this equipment. Always order a hydrotherapy unit to match your power supply.

2. Unit Rating 230 Volts, 60 Hertz or 50 Hertz, AC

Model	Rating Amperes
200	6.0

(Electric supply cord of this unit terminates with a UL "hospital grade" plug cap Hubbell #8615C or equal)

Note: A 15 ampere, 250 V., polarized, 3 wire "U" shaped grounding slot, tandem blade, "hospital grade" (Hubbell #8610 or equal) receptacle is to be made available by the user.

CAUTION

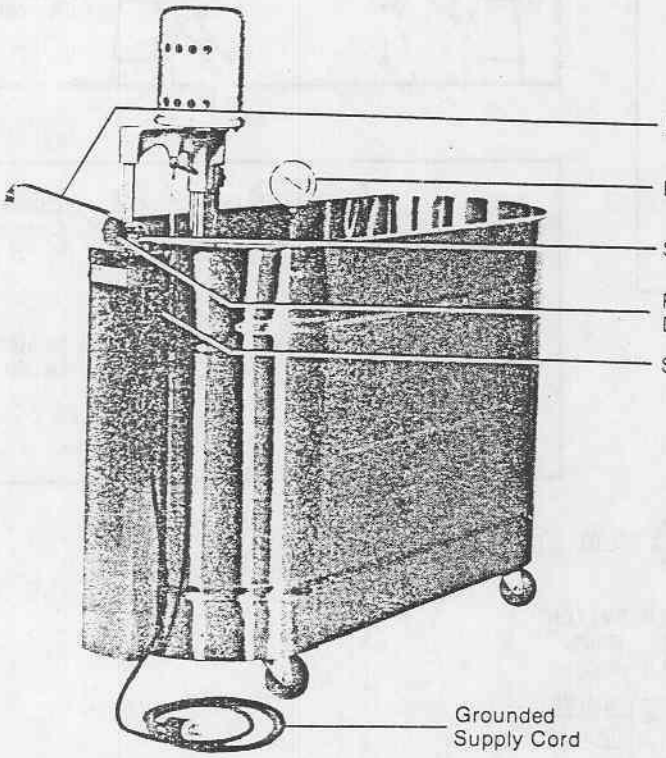
Incorrect current supply will seriously damage this equipment. Always order a hydrotherapy unit to match your power supply.

CAUTION

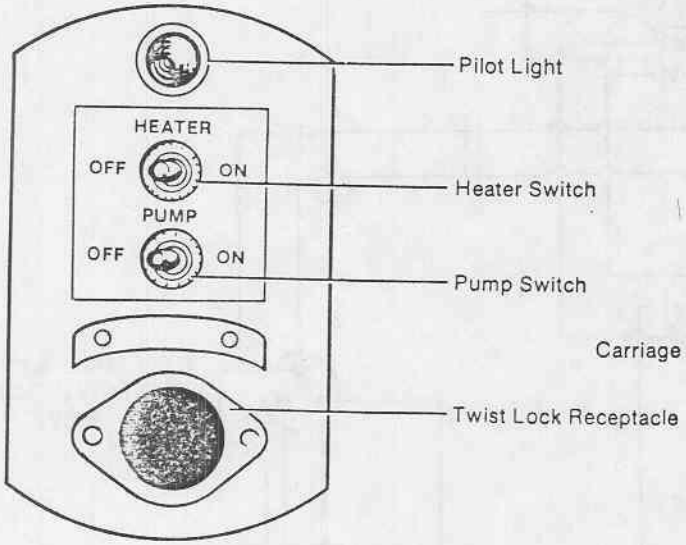
For safe operation, unit must be properly grounded. Failure to provide an approved properly grounded and polarized receptacle may result in serious injury.

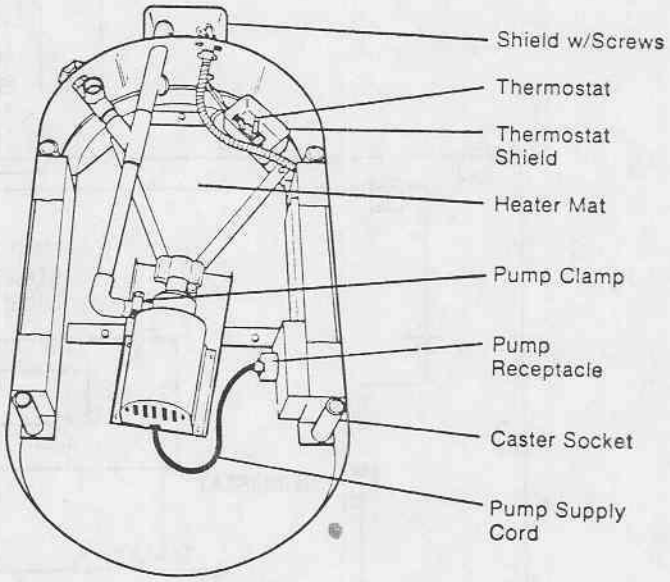
2.3 Drawings

2.3.1 Identification



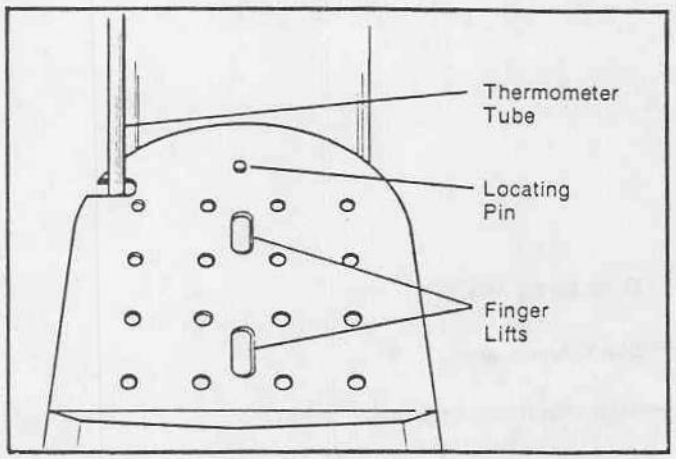
SWITCH SHIELD

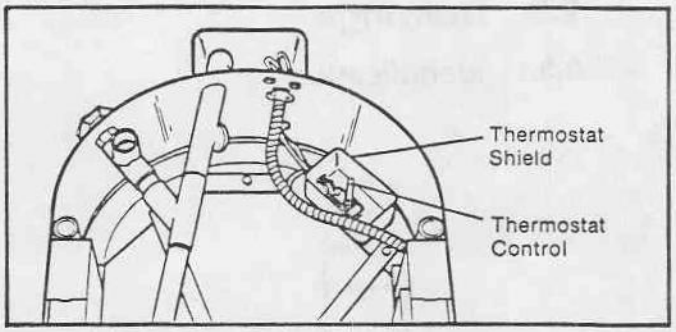


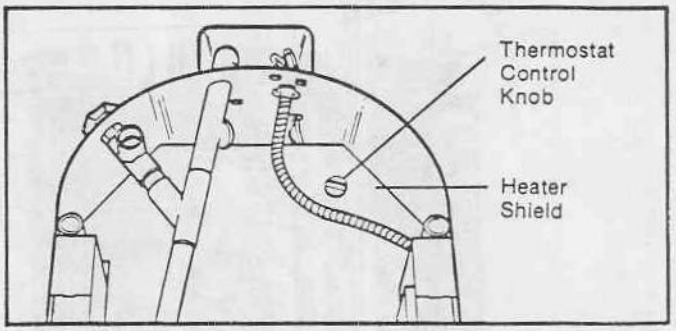


UNDERSIDE OF TANK

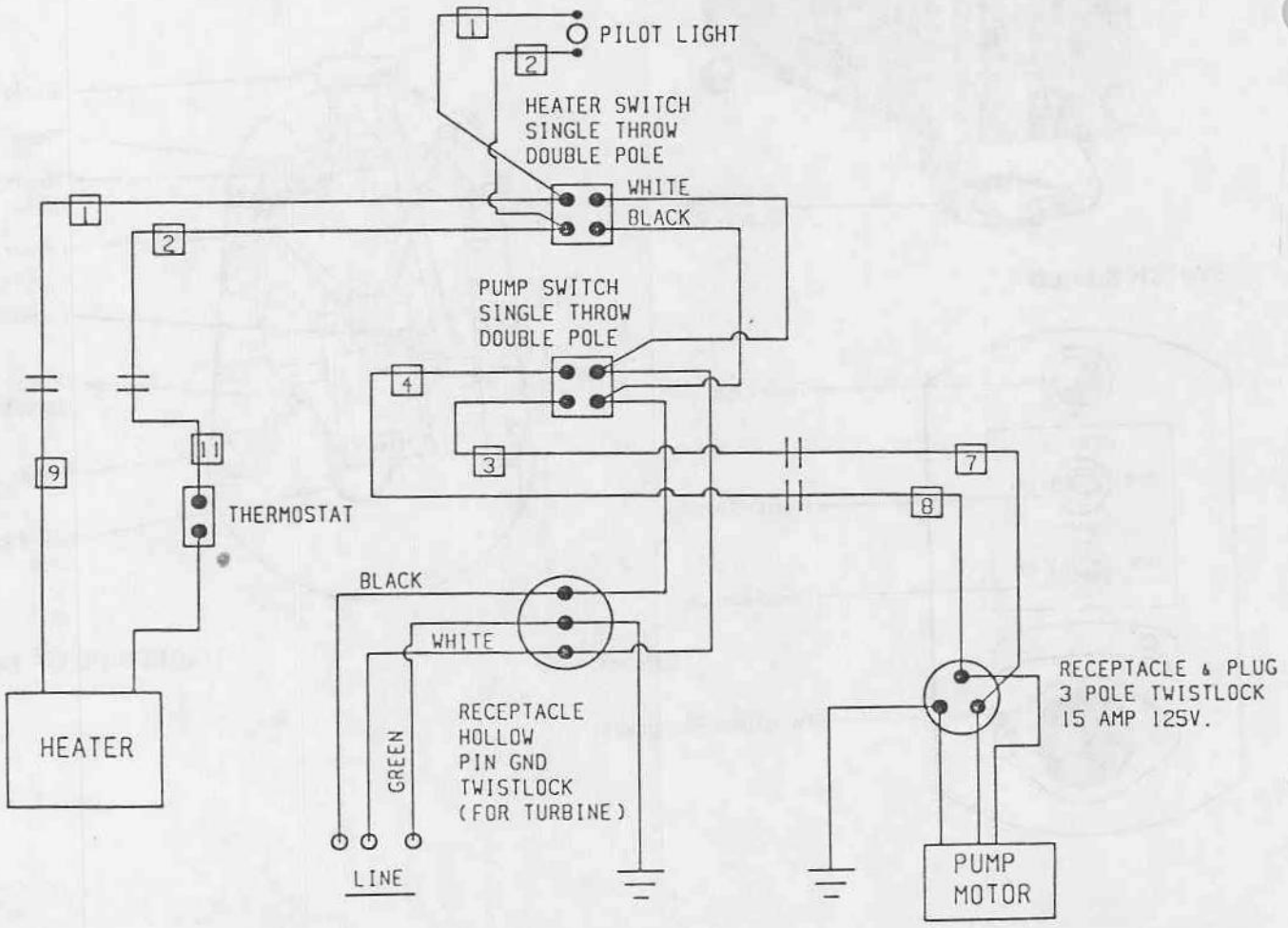
2.3.2 Heater Guard



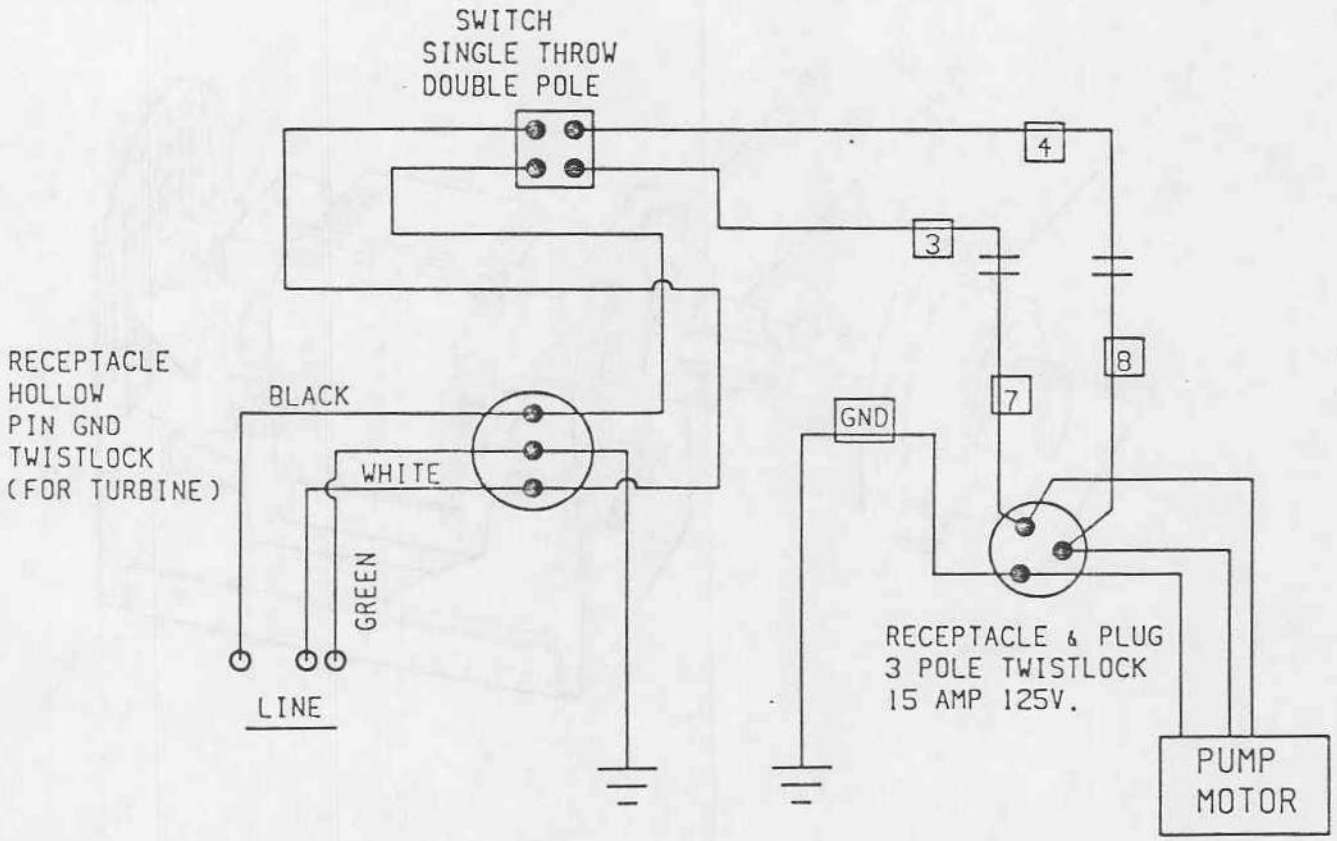




2.3.3 Model 200 With Heater

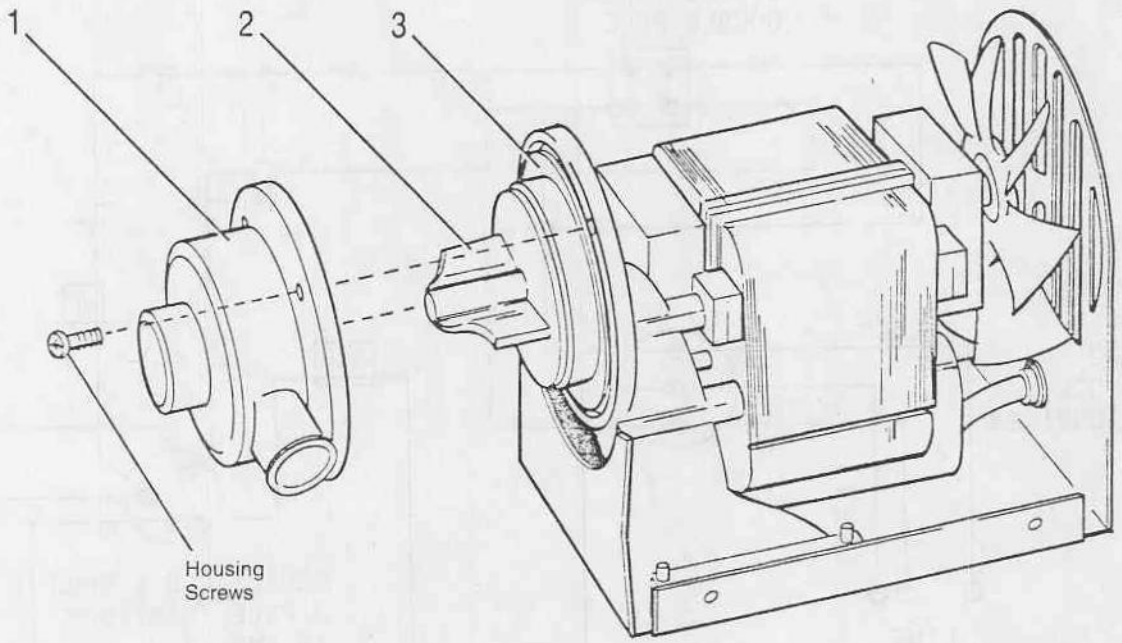


2.3.4 Model 200 Without Heater



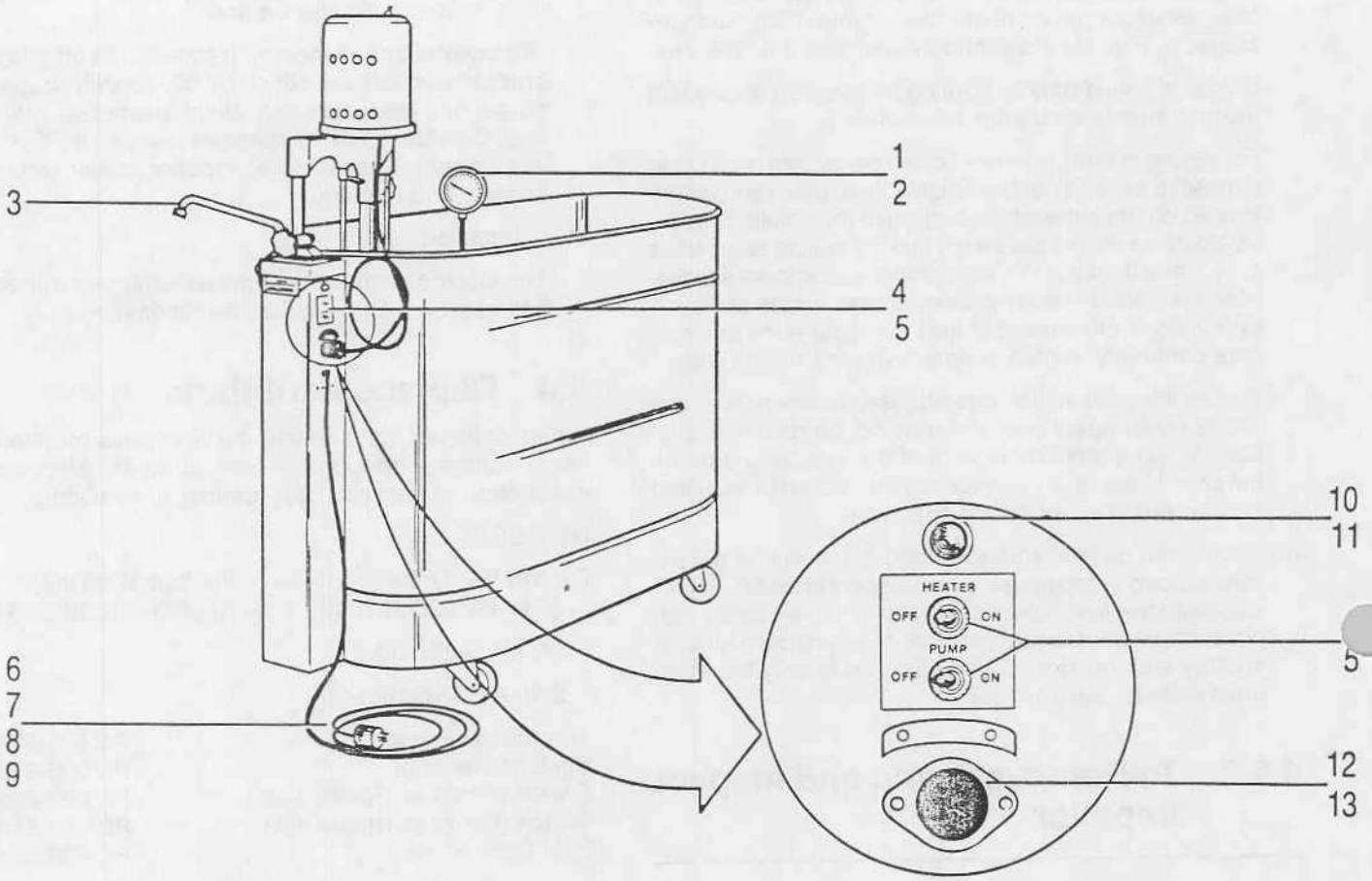
2.4 Parts Drawings

2.4.1 Pump and Components



Index No.	Part No.	Description	No. Req'd.
1	093-4839-00	Housing—Pump	1
2	093-4858-00	Impeller—Pump	1
3	093-8136-00	Seal—Pump	1
4	093-1001-00	Complete Pump Assembly, 115V, 60 Hz, Model No. 13773-1	1
5	093-1002-00	Complete Pump Assembly, 230V, 60 Hz, Model No. 13773-4	1
6	093-1003-00	Complete Pump Assembly, 115V, 50 Hz, Model No. 13773-3	1
7	093-1004-00	Complete Pump Assembly, 230V, 50 Hz, Model No. 13773-2	1

Parts List Information
Tank and Components



Index No.	Part No.	Description	No. Req'd.
1	093-8716-00	18" Thermometer Kit, Includes Bracket	1
2	093-8718-00	24" Thermometer Kit, Includes Bracket	1
3	093-1079-00	Drain Swing Arm	1
4	093-8559-00	Switch (Heater, Water Pump), Old Style	1
5	093-8558-00	Switch (Heater, Water Pump), Late Style	1
6	093-0601-00	Cord Assembly (with Heater) 3-Wire 14/3 "SJO", 15 Amp, 115V, Models 200, 305, 400, Discontinued HM255, HM300	1
7	093-0611-00	Cord Assembly (with Heater) 3-Wire 14/3 "SJO", 20 Amp, 115V, Models 275, 280, 285, 290, Discontinued HM295	1
8	093-0622-00	Cord Assembly (without Heater) 3-Wire, 16/3 "SJO", 15 Amp, 230V, Models 201, 276, 286, 291, 306, 401, Discontinued HM255D, HM295D, HM300D	1
9	093-0621-00	Cord Assembly (without Heater) 16/3 "SJO", 15 Amp, 115V	1
10	093-6818-00	Pilot Light, Red	1
11	093-8559-00	Pilot Light Cover, Red	1
12	093-7861-00	Receptacle Twistlock, Solid Pin, Old Style	1
13	093-7851-00	Receptacle Twistlock, Hollow Pin, Late Style	1

Section 3: Equipment Operation

3.1 Installation

3.1.1 Unpacking

1. Remove outer carton (pull nails from base; cut bands and carefully remove inner packing material.)
2. Now remove turbine ejector, samples of Ferno Ille products, and any small accessories from the packing shelf.
3. Refer to Turbine Manual for installation instructions.

WARNING
UNITS AFTER 3/85 ONLY

Counterbalance tube is gas-cylinder activated. Mount turbine before loosening friction clamp knob. Tighten friction clamp knob before removing turbine.

FAILURE TO HEED WARNING MAY RESULT IN INJURY TO PATIENT OR PERSONNEL.

3.2 Start-Up Procedures

3.2.1 Electrical

Have your professional electrician supply and install a wall receptacle in accordance with the national electrical code as a minimum requirement.

A. For all 115 Volt units—15 amps, or less
A "hospital grade" wire, "U" ground, 15A-125V., parallel blade receptacle (Hubbell #8200 or #8310 or equal) is required.

B. For all 115 Volt units—over 15 amps
A "hospital grade" 3 wire, "U" ground, 20A-125V., straight blade receptacle (Hubbell #8310 or equal) is required.

C. For all 230 Volt units
A "hospital grade" 3 wire, "U" ground, 15A-250V., tandem blade receptacle (Hubbell #8610 or equal) is required.

CAUTION

Be sure polarity and grounding of receptacle wiring are correct. Incorrect polarity and ground connections to a receptacle may result in serious injury to patient and operator.

3.2.2 Preparing Tank Unit

1. Clean tank.
2. A dial thermometer has been mounted onto the inner tank wall at our plant. The tube and thermometer may be rotated in any convenient position by loosening the nylon thumbscrew in bracket. After adjusting, keep screw in locked position to prevent rattling of tube.
3. Fill tank with warm water, at desired temperature, to within 5 inches from top of tank. A filler hose is provided for attachment to faucet. Use thermometer for checking temperature.

CAUTION

If water is mixed in tank, thermometer will be damaged if it comes in contact with water over 160°F.

3.2.3 Thermostatically Controlled Heater Operation

1. The thermostatically controlled electric heater is provided primarily for making up heat losses of the tepi water preliminary to treatment. This is especially valuab if there is a delay in preparing the patient for treatment. Temperature of the water remains relatively constant during an average 20 minute treatment period.

   Note: The electric heater is only intended for use as a maintenance heater. It is not able to raise the water temperature from cold to treatment temperature.

2. The thermostat controls water temperature at an approximate maximum of 110°F. Range of thermostat can be readily adjusted in the field. All thermostats are factory set for operation at approximately 105°F. A slight adjustment may be required to compensate for varying field conditions. (Refer to page 2-5 for adjustment instructions).

   Your electric heater is not intended for use without water in the tank. Although the thermostat will serve as a control to minimize excessive heating, the life of all components will be reduced.

   A red pilot light, located in the unit switch shield, indicates when the heater switch has been turned on.

3.2.4 Heater Guard

1. A heater guard, shown in position, is supplied with every unit. This prevents possible sensitive areas of a patient's foot from coming into direct contact with the warm tank bottom. See Figure 00.
2. A matching proportionately-sized heater guard is supplied for each hydromassage tank. Each guard indexes on the locating pin and thermometer.
3. The guards are not necessarily interchangeable in different size hydromassage tanks.

WARNING

Make certain guard is used at all times.

FAILURE TO HEED WARNING MAY RESULT IN INJURY.

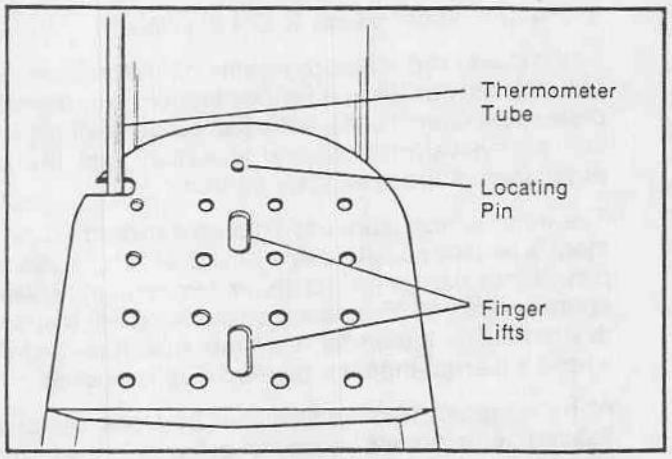
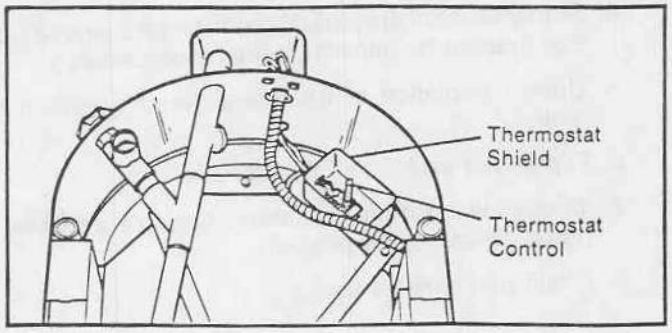
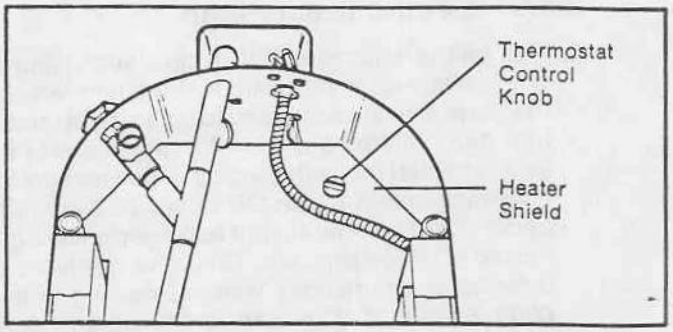


Figure 2-2
Heater Guard





3.2.5 Heater Thermostat Adjustment

1. Fill tank 5 inches below rim with tempered water. Have temperature of water a few degrees below prescribed treatment temperature.
2. Turn heater switch on—red pilot light indicates when heater switch is in ON position. Make a note of the temperature shown on your dial thermometer.
3. Before attempting any adjustment, allow heater to operate for one hour.

Note: The heater thermostat is mounted to the underside of the tank bottom. It is located on the right hand side at the switch shield end of tank. (See Figure 00).

4. Reach under tank and grasp plastic thermostat adjusting knob. One end of knob has a point. Rotate knob pointer end clockwise to lower the temperature, and rotate knob pointer counterclockwise to raise the temperature. Only a slight movement is required.
5. Allow one hour to elapse before reading thermometer. Follow same procedure to make any additional adjustments.

Note: 105°F setting is approximately midway between the high and low stops.

WARNING

Always disconnect electric supply cord prior to servicing.

FAILURE COULD CAUSE SERIOUS INJURY TO OPERATOR.

3.2.6 Electric Drain Pump

1. The unit is equipped with a quick-emptying electric pump attached to the bottom of the tank which drains the water at a rate according to tank size. To empty tank, turn swing drain nozzle until it projects over basin or sink, and start motor by placing switch marked "pump" on switch shield to the ON position. A valve located under the base of tank, with hand grip showing, is connected to the pump drain. This valve permits complete draining of any residue water remaining in the drain pump system. If floor drain is available, tank may be emptied faster by using pump and opening valve at the same time.
2. As with all centrifugal pumps, it is necessary to flood the unit with liquid before pumping will commence.

> **CAUTION**
>
> DO NOT operate pump when tank is dry. Doing so will reduce the life of the pump seal.

3. The pump motor is protected by a built-in automatic reset thermal cut-out. This thermal cut-out prevents damage to the motor by automatically breaking the circuit before a dangerously high temperature is reached. Once the circuit is interrupted, the motor will not start again until cooled or circuit resets itself. However, motor will start again and stop again when overheated. This cycle will continue until the overload has been eliminated.

Note: When salt solutions are used, the residue water must be drained immediately after treatment, and the tank and pump system should be flushed with fresh water. If permitted to remain, the salt solution will attack the pump and eventually destroy it.

> **CAUTION**
>
> Gauze, "band-aids", bandage clips, and other foreign matter are detrimental to pump performance and should be removed from patient as much as possible.

3.3 Detailed Operating Instructions

Note: It is not the intent of Ferno Ille to attempt to direct the clinical care of your patient but to advise you in the proper use of Ferno Ille equipment to maximize the quality of your clinical care.

> **WARNING**
>
> Hydrotherapy units are not intended for use with "electrically susceptible patients".
>
> FAILURE TO HEED WARNING MAY RESULT IN INJURY.

1. Fill tank with water to desired treatment level. (Consult mixing valve operations manual for filling procedures.)
2. Check water temperature.

> **CAUTION**
>
> Always verify water temperature.
> FAILURE TO DO SO MAY RESULT IN A SCALD HAZARD.

3. Flip the heater switch to ON position.

When giving hydrotherapy treatment, the tolerance of the patient must be taken into consideration. This tolerance is dependent upon the patient's subjective feelings, the patient's physical and medical condition, and the pathophysiology of the area to be treated.

The water temperature used during a hydrotherapy treatment is usually specified by a physician or physical therapist. It can vary from the lower temperature spectrum, approximately 65°F, where a cryotherapeutic response is desired to the higher temperature spectrum, 96°-104°F, where a thermo-therapeutic response is desired.

All hydrotherapy treatments should be monitored until the desired temperature range is established. Monitoring should continue throughout the duration of the treatment, usually 20-30 minutes.

4. Start treatment process. Refer to turbine ejector operation manual for correct operating procedures.
5. Upon completion of treatment, remove patient from tank.
6. Flip heater switch to OFF position.
7. To drain water from tank, move unit to drain area, flip pump switch to ON position.
8. Clean and sanitize tank.

3.4 Shutdown Procedures

1. *Electric drain pump*
   The electric drain pump is protected by a built-in automatic reset thermal cut-out. This thermal cut-out prevents damage to the motor by automatically breaking the circuit before a dangerously high temperature is reached. Once the circuit is interrupted, the motor will not restart again until cooled or circuit resets itself. However, motor will start and stop again when overheated. This cycle will continue until the overload has been eliminated.

Section 4: Maintenance and Repair

4.1 Preventive Maintenance

Note: Please carefully read these important instructions. Failure to observe instructions will void warranty.

This unit is fabricated of AISI type 304 stainless steel for increased corrosion resistance. However, it is not a magic metal. Cleaning is required for it to keep its polished look.

Foreign matter is deposited onto your stainless steel tank in the form of film every time it is used. The film is generated by body oils, minerals in the water, organic deposits, and other foreign matter. If film is left on the tank, eventually the foreign particles will cause corrosion, leaving pit marks in the surface of the stainless steel.

Even more important than appearance are the bacteriological infection problems that may develop through contamination of water, equipment and inappropriate treatment procedures. Treatment water may include Chlorazene Whirlpool Antiseptic to maintain low bacterial levels. Experience and common sense dictate that the water should be changed completely after each treatment. The tank should then be cleaned and sanitized with Sanizene Hard Surface Disinfectant and rinsed with hot water.

The acid-alkaline balance of the water in your tanks should be approximately 7.4-7.8 for best corrosion resistance.

> **CAUTION**
>
> If chlorides are used, maintain the lowest concentrations for the intended purpose. Chloride ions are the major cause of pitting and intergranular corrosion. However, Chlorazene has been tested safe for stainless steel because of its slow release of chlorine.

Remove hair and debris from drain after each use.

4.2 Cleaning

4.2.1 Routine Cleaning

Use Sanizene Hard Surface Disinfectant in solution (see instructions for use on container), soap or detergent in solution. With soft cloth, wipe entire surface area. Rinse with hot water.

Note: When disinfecting the tank, consult the directions on the disinfectant container for proper use and disinfecting procedures.

> **CAUTION**
>
> The tank must be completely rinsed and free of disinfectant.
> FAILURE TO DO SO COULD CAUSE DISCOMFORT AND/OR IRRITATION TO NEXT PATIENT.

To Remove Stubborn Spots and Stains

Use a good stainless steel cleanser such as Ille Steelscrub and vinegar. Scrub the area with a cloth, sponge, stainless steel wool or cleaning pad. Let stand for approximately 5 minutes. Rinse with warm water and wipe dry.

Note: Always rub in the direction of polish lines for maximum effectiveness.

Rinse thoroughly with fresh water after every cleaning operation.

Always wipe dry to avoid water marks.

NEVER USE STEEL WOOL.

> **WARNING**
>
> High concentrations of sodium or calcium hypochlorite will damage your hydrotherapy tank and affect the warranty.

4.3 Maintenance Procedures

4.3.1 Drain Pump

> **CAUTION**
>
> Refer electrical servicing to a professional electrician or a qualified service technician.

When water fails to flow or runs slowly out of swing drain nozzle, it is usually due to an obstruction in the pump or discharge piping.

1. Be sure pump operates when pump switch is turned on. Turn pump switch ON, reach under tank and touch pump. A vibration can be detected if pump is running. If so, follow step 2. If not, follow step 3.
2. Probe into swing drain nozzle with a piece of wire. If the nozzle was clogged, you probably found the obstruction. Put water in tank and try pump. If no obstruction was found, the problem is in another part of the system. Try counterflushing drain pump system. Remove turbine (use safety lock pin). Turn tank upside down. Attach your filler hose to swing arm nozzle. Connect other end of hose to cold water supply. Open faucet slightly (very slow flow), and any small particles will be flushed on floor. Rotate tank to normal position, and open drain valve under tank. (Should counterflushing fail, follow step 4.)

3. If pump still does not operate, the pump switch may be defective. To check switch, empty tank, insert "safety lock pin in raising and lowering device tube," remove turbine, and lay tank on side. Unplug pump supply cord. Now insert continuity tester probes into drain pump receptacle. Flip drain switch to determine if it operates.

   Switch in shield may be verified as follows: (disconnect electric supply cord prior to servicing).

   For testing of drain pump or heater switch, you must gain access to the back of the shield. To do this, remove the screws on the sides at the bottom of the shield. Slip the shield down and remove from tank by pulling apart wires 1, 2, 3, and 4, or 3 and 4 at the quick disconnect splices. Place continuity tester probes across 2 sets of switch terminals. If movement of switch toggle does not indicate continuity, switch is defective (see Figure 2-8).

   The switch used in this assembly is a double pole switch of a fairly compact size and may not be readily available. Ille will supply replacement from stock at a nominal cost. Have your professional electrician or qualified service technician perform this work.

4. Should the backwashing method fail, it will be necessary to open pump housing and inspect impeller. To proceed with this inspection, empty tank, "insert safety lock pin in raising and lowering device tube", remove turbine, and lay tank on side. Safety lock pin is only found on units prior to June 1, 1986.

4.3.2 To Remove Pump and Inspect Impeller

> **CAUTION**
>
> Always disconnect power supply prior to servicing unit.

A. Pump Removal (Figure 2-5)

   1. Disconnect pump power cord.
   2. Loosen and slip back the 2 hose clamps.
   3. Remove the 4 pump mounting screws.
   4. Slip out copper drain tubing assembly.
   5. Slide pump off cast elbow spud housing. (Save all parts.)

B. Dismantle Pump (Figure 2-6)

   1. Remove the 4 housing screws—lift housing off. Any misplaced matter can be removed.
   2. Since impeller is flexible, it is unlikely that it will ever require replacing. However, it can be removed by turning it sharply to the left. It will then unscrew to the left. (Replacement impellers part #093-4858-00 may be ordered from Ille.)

C. Pump Seal

   If the drain pump was accidentally run dry for an extended period, the seal may require replacement to prevent dripping of water on floor.

   Remove cover and mounting screws. Lift off cover and bracket. Remove impeller (see B2, above). Now pull off rubber ring (approximately 2¼ in. diameter.) This is the seal. Carefully push replacement seal part #093-8136-00 in position. Reassemble impeller, cover, mounting screws, and housing.

D. Lubrication

   The electric motor of the pump is equipped with sealed ball bearings and requires no lubrication.

4.4 Replacement Parts

When ordering replacement parts, always mention unit serial number and unit model number. Also include description of part and part number (if available).

HEATERS

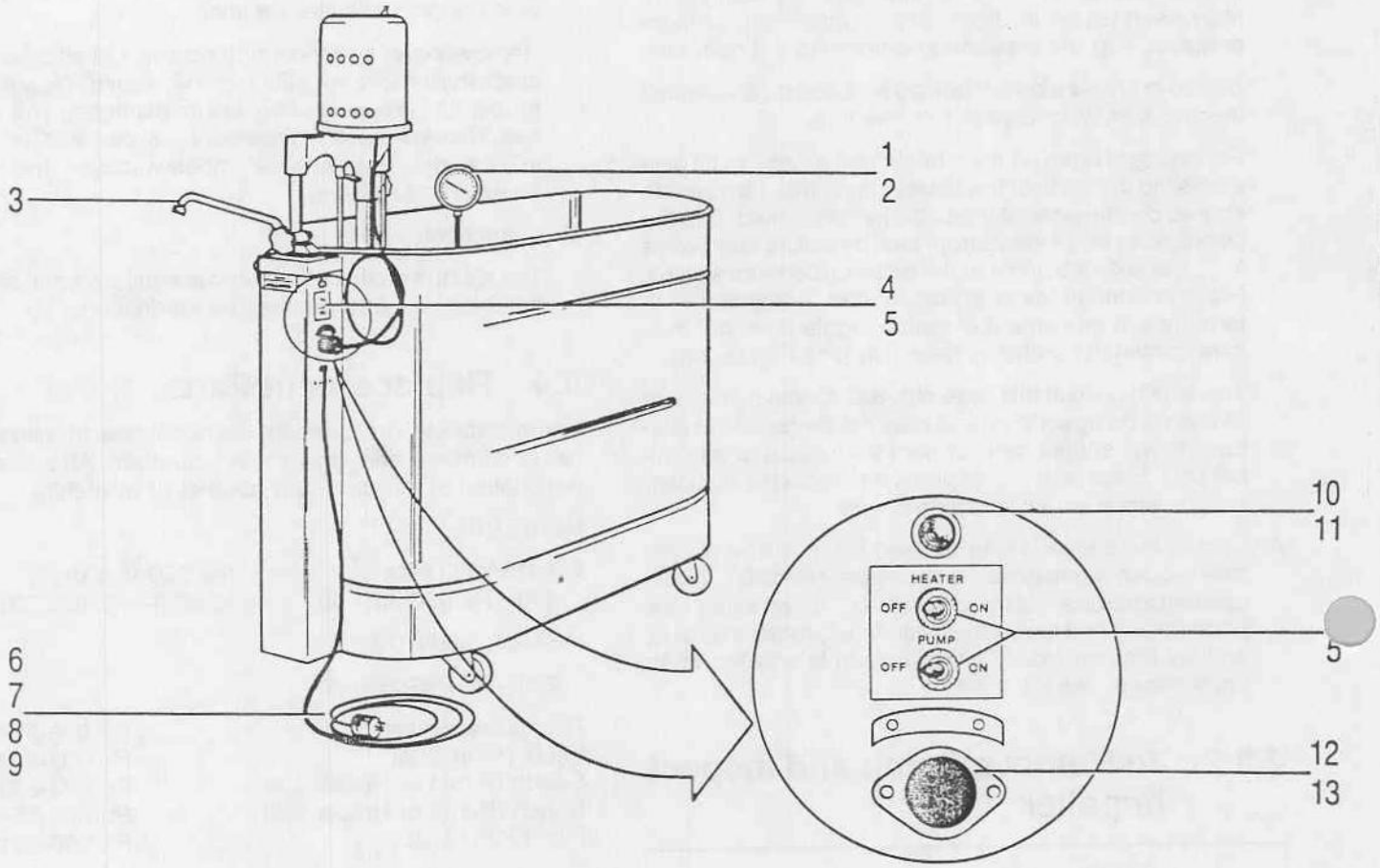
For 115 Volt Units	For 230 Volt Units
200—Pt. 093-3511-00	HM200—Pt. 093-3512-00

HEATER GUARDS

200—Pt. 093-1516-00

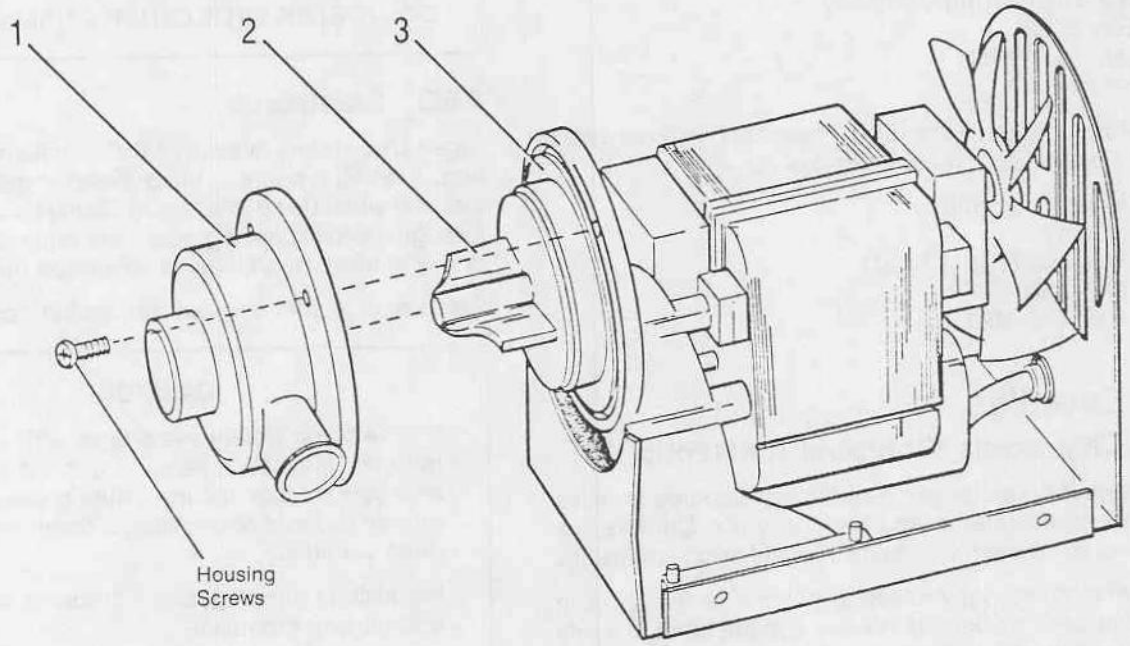
Thermostat Heater	Pt. 093-8776-00
Knob Thermostat	Pt. 093-5106-00
Switch (Pump or Heater, Late)	Pt. 093-8558-00
Switch (Pump or Heater, Old)	Pt. 093-8559-00
Pilot Light (Bulb only)	Pt. 093-6818-00

Parts List Information
Tank and Components



Index No.	Part No.	Description	No. Req'd.
1	093-8716-00	18″ Thermometer Kit, Includes Bracket	1
2	093-8718-00	24″ Thermometer Kit, Includes Bracket	1
3	093-1079-00	Drain Swing Arm	1
4	093-8559-00	Switch (Heater, Water Pump), Old Style	1
5	093-8558-00	Switch (Heater, Water Pump), Late Style	1
6	093-0601-00	Cord Assembly (with Heater) 3-Wire 14/3 "SJO", 15 Amp, 115V, Models 200, 305, 400, Discontinued HM255, HM300	1
7	093-0611-00	Cord Assembly (with Heater) 3-Wire 14/3 "SJO", 20 Amp, 115V, Models 275, 280, 285, 290, Discontinued HM295	1
8	093-0622-00	Cord Assembly (without Heater) 3-Wire, 16/3 "SJO", 15 Amp, 230V, Models 201, 276, 286, 291, 306, 401, Discontinued HM255D, HM295D, HM300D	1
9	093-0621-00	Cord Assembly (without Heater) 16/3 "SJO", 15 Amp, 115V	1
10	093-6818-00	Pilot Light, Red	1
11	093-8559-00	Pilot Light Cover, Red	1
12	093-7861-00	Receptacle Twistlock, Solid Pin, Old Style	1
13	093-7851-00	Receptacle Twistlock, Hollow Pin, Late Style	1

Parts List Information
Pump and Components



Index No.	Part No.	Description	No. Req'd.
1	093-4839-00	Housing—Pump	1
2	093-4858-00	Impeller—Pump	1
3	093-8136-00	Seal—Pump	1
4	093-1001-00	Complete Pump Assembly, 115V, 60 Hz, Model No. 13773-1	1
5	093-1002-00	Complete Pump Assembly, 230V, 60 Hz, Model No. 13773-4	1
6	093-1003-00	Complete Pump Assembly, 115V, 50 Hz, Model No. 13773-3	1
7	093-1004-00	Complete Pump Assembly, 230V, 50 Hz, Model No. 13773-2	1

4.5 Repair Procedure

Service Engineering Company is the only authorized Ferno Ille service dealer. They have a network of service agencies across the United States to provide prompt service. To contact them, call or write:

Service Engineering Company
P.O. Box 25021
Raleigh, NC 27611
1-800-334-5528

For questions about items under warranty, you may also contact Ferno Ille Customer Service at:

Ferno-Washington, Inc.
70 Weil Way
Wilmington, OH 45177-9371
(513) 382-1451
Fax: (513) 382-1191

4.6 Supplies

4.6.1 Chlorazene Whirlpool Antiseptic

Chlorazene is an antiseptic powder, non-staining additive for whirlpool treatments and bathing units. Chlorazene, when used as directed, will control harmful micro-organisms.

Chlorazene Whirlpool Antiseptic powder is available in handy unit dose packages. Always consult label to verify correct dose for the gallons of water used per treatment.

CAUTION

DO NOT SHAKE CHLORAZENE IN THE AIR as dusting may cause irritation to membranes. Dispose of Chlorazene package in a closed receptacle.

Keep out of reach of children. Avoid inhaling powder. Avoid contact with eyes. In case of contact with eyes, flush with plenty of water.

In case of accidental ingestion, seek professional assistance or contact the Poison Control Center immediately. Avoid storing in excessive heat.

DO NOT MIX WITH ANY OTHER CHEMICALS.

4.6.2 Medifome

Medifome is an underwater patient massage, water softener, detergent and deodorant treatment.

Medifome is added when tank is full and lasts one treatment.

Medifome is sold in quart and gallon containers.

CAUTION

Emergency first aid procedure if concentrated Medifome is splashed in eyes, flush with water for 5 or more minutes. If ingested, drink milk, egg whites, or large amounts of water.
DO NOT MIX WITH OTHER CHEMICALS.

4.6.3 Steelscrub

Steelscrub cleans, bleaches and disinfects in one application. A small amount is used. Rubber gloves are recommended when using Steelscrub. Materials can be absorbed through the skin causing possible kidney damage if in contact with large quantities for extended periods.

Steelscrub is sold in quart and gallon containers.

CAUTION

If Steelscrub enters eyes, flush with water for 15 minutes. If irritation persists, contact physician. If skin contact has occurred during use, rinse thoroughly to avoid absorption. If taken internally, induce vomiting.

Hazardous decomposition products are chlorine and carbon monoxide.

If using large amounts, use protective glasses and gloves.

DO NOT MIX WITH ANY OTHER CHEMICAL.

4.6.4 Sanizene Hard Surface Disinfectant

Sanizene Hard Surface Disinfectant is used on hard non-porous surfaces. Use one ounce of Sanizene per gallon of water for a minimum contact time of 10 minutes for a single application. Sanizene can be applied with a mop, sponge, or cloth as well as spraying. For best results, mix Sanizene and water together before each cleaning. Use protective glasses and gloves.

Sanizene is sold in unit-dose quart and gallon containers.

CAUTION

In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. For eyes, call a physician. If swallowed, immediately drink a large quantity of milk, egg whites, gelatin solution, or if these are not available, drink large quantities of water. AVOID ALCOHOL. Get medical attention.

NOTE TO PHYSICIAN

Probable mucosal damage may contraindicate the use of gastric lavage. Measures against circulatory shock, respiratory depression, and convulsion may be needed.

DO NOT MIX WITH ANY OTHER CHEMICAL.

Chlorazene Material Safety Data

Health Hazard Data

Threshold Limit Value	Not Applicable
Effects of Overexposure	Not Applicable
Emergency and First Aid Procedures	Get in Eyes: Rinse eye(s) with running water for at least 15 minutes. Seek medical attention. Wash skin with soap and water, rinse well. Inhalation: seek fresh air and rest, seek medical attention. Swallowing: water and active charcoal. Seek medical attention.

Reactivity Data

Stable	Under 35°C
Conditions to Avoid	Do not store above 35°C, store away from heat.
Incompatibility	Acids, cl2
Hazardous Decomposition Products	With acids cl2 results, thermal decomposition, smoke but no fire.
Hazardous Polymerization	Decomposition sets in within 15 minutes at 130°C under foaming.

Spill or Leak Procedures

Steps to Be Taken	Sweep up, avoid dust.
Waste Disposal Method	Add to a solution of sodium thiosulfate or sodium sulfite, this decomposes the material to harmless tolueane sulfonamide.

Special Protection Information

Respiratory Protection	Dust filters
Ventilation	Local exhaust
Protective Gloves	Wear gloves
Eye Protection	Not Applicable

Special Precautions

Handling and Storing	Do not store above 35°C.

Medifome

Identification

Manufacturer's Name	Clarkson Chemical Company Inc. 213 Main Street So. Williamsport, PA 17001
Chemical Name and Synonyms	Not Applicable
Trade Name and Synonyms	Medifome
Chemical Family	Detergent
Formula	See Below

Hazardous Ingredients

Pigments	Not Applicable
Catalyst	Not Applicable
Vehicle	Not Applicable
Solvents	Not Applicable
Additives	Not Applicable
Base Metal	Not Applicable
Alloys	Not Applicable
Metallic Coating	Not Applicable
Filler Metal	Not Applicable
Hazardous Mixtures of Other Liquids, Solids, or Gases	TLV (Units)
Thymol Crystals	0.06%
Oil of Eucalyptus	0.15%
Methyl Silicate	0.15%
Oil of Thyme	0.07%
Hexametaphosphate	4.10%
Pine Oil	1.60%
Sulphonated Castor Oil C-75	24.00%
Caustic Potash	0.16%
Water	70.00%

Physical Data

Boiling Point (°F)	212°
Vapor Pressure	Not Applicable
Vapor Density (Air = 1)	Not Applicable
Solubility in Water	Very Good
Specific Gravity (H_2O = 1)	Not Applicable
Percent Volatile by Volume	Not Applicable
Evaporation Rate	Not Applicable
Appearance and Odor	Green—Wintergreen Pine

Steelscrub Material Safety Data

Health Hazard Data

Threshold Limit Value	Not Applicable
Effects of Overexposure	Can be absorbed through skin, to cause kidney damage (contact with large quantities for extended periods)
Emergency and First Aid Procedures	Get in Eyes: Flush with water for 15 minutes. If irritation persists, contact physician. If Contact with Skin: Wash immediately to avoid absorption. If taken internally, induce vomiting.

Reactivity Data

Unstable	Keep away from heat and acids.
Incompatibility	Not Applicable
Hazardous Decomposition Products	Chlorine, Carbon Monoxide
Hazardous Polymerization	Will not occur.

Spill or Leak Procedures

Steps to Be Taken	If spilled, material may be washed down with water, then absorbed with sweeping compound.
Waste Disposal Method	Transport to Landfill.

Special Protection Information

Respiratory Protection	Not Applicable
Ventilation	Not Applicable
Protective Gloves	Wear gloves
Eye Protection	Wear Eye Protection

Special Precautions

Handling and Storing	Under normal conditions, product is not hazardous and requires no special handling.

Sanizene Material Safety Data

Health Hazard Data

Threshold Limit Value	Not Applicable
Effects of Overexposure	Eyes—causes eye damage. Skin—causes severe skin irritation. Ingestion—harmful or fatal if swallowed.

Emergency and First Aid

Procedures	Eyes—Immediately flush eyes with plenty of water for 15 minutes. Call a physician immediately. Skin—immediately flush skin with plenty of water for 15 minutes. Ingestion—drink promptly a large quantity of milk, egg whites, gelatin solution or large quantity of water. Get medical attention.

Reactivity Data

Stable

Incompatibility	Acids
Hazardous Decomposition Products	None
Hazardous Polymerization	Will not occur.

Spill or Leak Procedures

Steps to Be Taken	Mop or flush with water. Avoid contamination of food, water or feed.
Waste Disposal Method	If waste cannot be disposed of by use according to label instructions, contact your state pesticide or environmental control agency, or the hazardous waste representative at the nearest EPA Regional Office for guidance.

Special Protection Information

Respiratory Protection	None
Ventilation	Not Applicable
Protective Gloves	Wear gloves
Eye Protection	Goggles or face shield.

Special Precautions

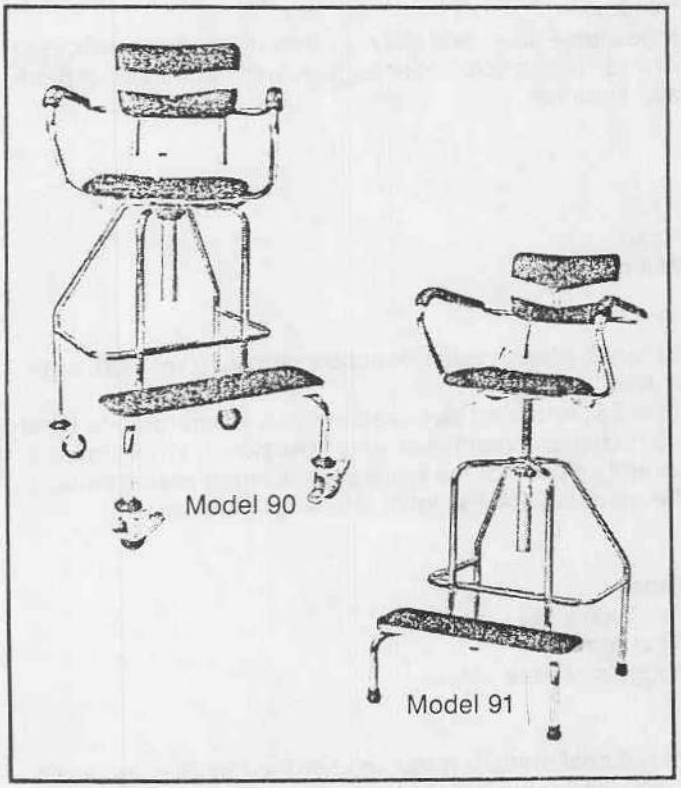
Handling and Storing	Do not contaminate water, food or feed by storage or disposal. Open dumping is prohibited. Do not reuse empty container.

4.7 Accessories

Note: Accessories are priced separately and furnished only when specified.

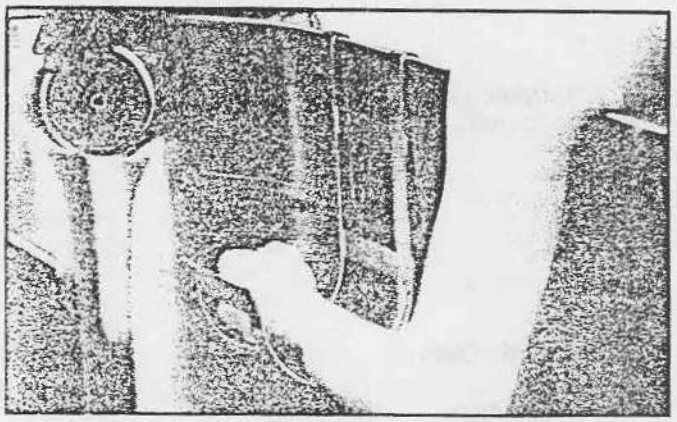
Adjustable High Chair—Model 90, 91

These indispensable chairs are an accessory especially designed for use with leg tank units. The special construction of the chair permits the seat to protrude over the edge of tank, affording maximum comfort to patient during foot and lower leg treatment.



Arm Rest—Model 11

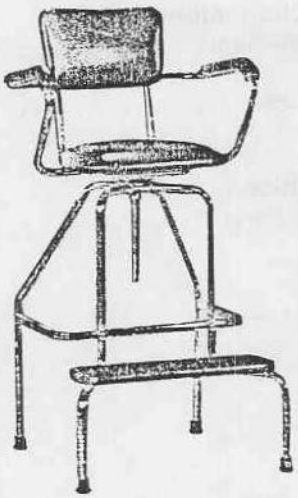
For supporting arm inside of tank during treatment. Made of stainless steel.



Hydro-Chair—Models 23, 24

Economy, lighter weight model chair for patients using hip and leg whirlpools, adjustable seat, step height 12″, two arm rests. Chair frame tubular steel. Seat height adjusts from 29″-39″.

Model 23—Order No. 078-1210-00 (without casters)
Model 24—Order No. 078-1220-00 (with casters)



Section 5: Warranty

This equipment has been carefully inspected and tested and is fully covered by the Ferno Ille guarantee provided the Warranty Card is mailed within ten days from receipt of product.

Ferno Ille will guarantee all Ferno Ille equipment to be perfect in material and workmanship. We agree to replace free of charge any part that may be found defective if this part is returned to us, transportation charges prepaid, within one year from date of purchase. This service guarantee is not to be construed to cover willful neglect or misuse and does not apply to standard electrical equipment, lamps, bulbs, switches, receptacles, etc.

Ferno Ille cannot assume responsibility for repairs made by others.

FERNO

IIIe

Ferno-Washington, Inc.
70 Weil Way
Wilmington, OH 45177-9371
Phone: 513/382-1451
FAX: 513/382-1191

Gov. 200

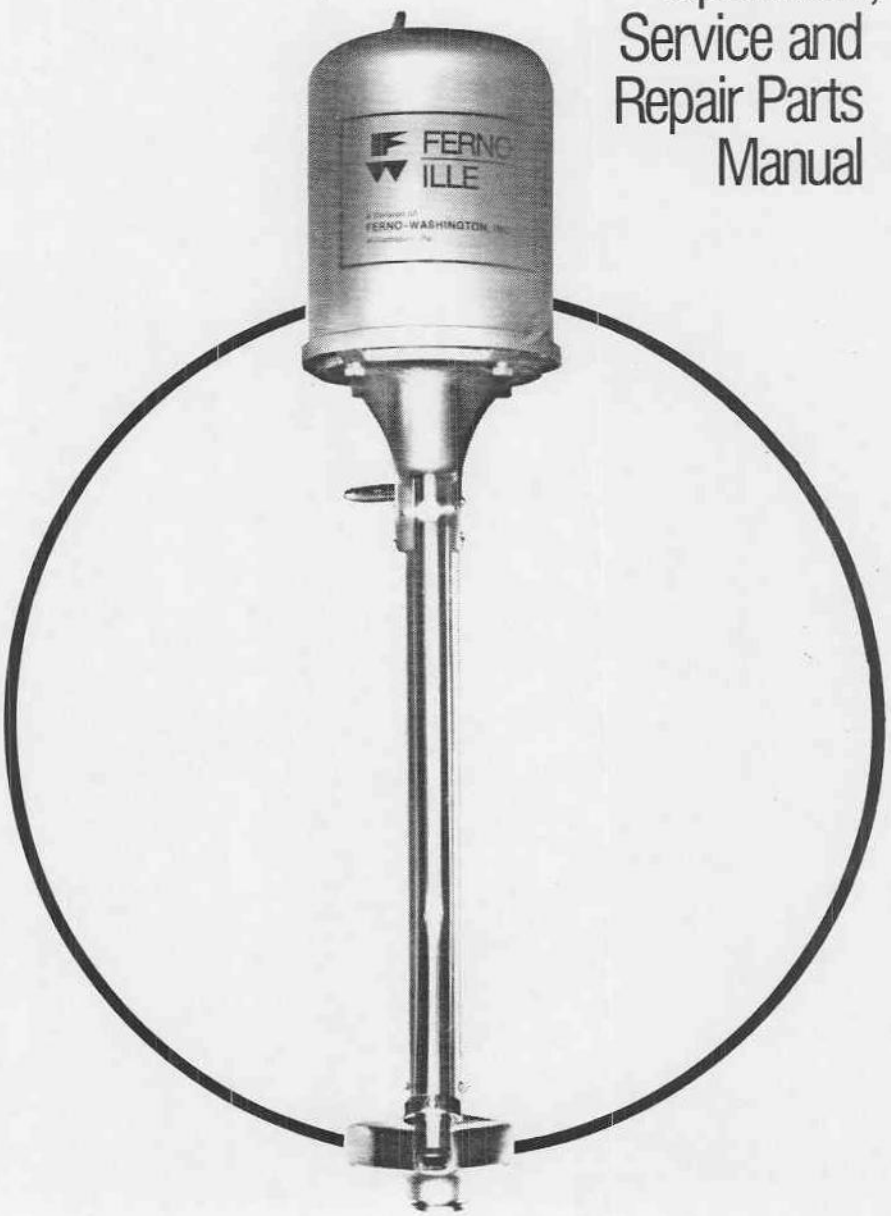
FL-044-B
Printed in U.S.A.

FERNO

Ille

Model 100 Electric Turbine Ejector

Operation, Service and Repair Parts Manual



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Section 5: Warranty

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NOTE: Due to our Constant Improvement Program, Units are Subject to Change Without Notice.

Section 2: Equipment Data and Drawings

2.1 Model 100 Electric Turbine Ejector

The Ferno Ille Turbine Ejector is supplied in various sizes and with various electric supply cord terminations. Following is a list of various supply cord terminations according to use. Mechanical length variations of the turbine are not listed. The turbine ejector, packed with your unit, will be the proper physical size for use with your unit.

Note: Ille Electric Turbine Ejectors are available for operation on the following electrical services:

115 Volts—60 Hertz—AC
115 Volts—50 Hertz—AC
230 Volts—60 Hertz—AC
230 Volts—50 Hertz—AC

115 Volt—60 Hertz units are supplied as standard. The other current characteristics must be specified on your order.

Drain Pump Units

For Models 200, HM255, 275, 280, 285, 290, HM295, HM300, 305, HM310D, 400, 160, 161, 165, 166, 901, 911, and similar units:

The supply cord terminates with a midget, twist-lock, dead front, cord cap. 115 Volt units have a Hubbell #7594 with a hollow center pin and 230 Volt units have a Hubbell #7485 with a solid center ground pin.

Non-Drain Pump Units (Stationary)

For Models 500, HM505, 600, HM655, 675, 680, 685, 690, HM1000, HM1010, 1005:

The supply cord terminates with a "hospital grade" parallel blade, "U" ground, cord cap for 115 Volt units, and supply cord terminates with a "hospital grade", tandem blade, "U" ground, cord cap for 230 Volt units. These cord caps are for connection into a wall receptacle supplied by the customer.

After 7/86, supply cord for non-drain pump units terminates with a ground fault circuit interrupter (GFCI) plug. For 115 Volt—60 Hertz - 15 amp plug, configuration is parallel blade, "U" ground, NEMA 5-15P.

Note: Canadian Units Only (CSA):
These units are supplied, at an additional cost, with a receptacle junction box mounted on the unit. This receptacle box accepts a cord cap termination as used on drain pump units.

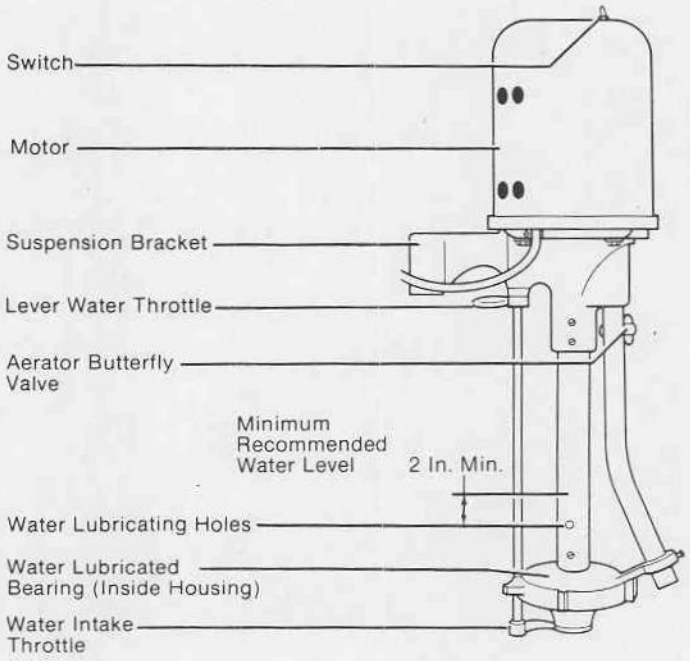
For Models 801, 825, 850, 110, 1200, and 1610 Series:

The supply cord terminates with a midget, twist-lock, dead front cord cap. 115 Volt units have a Hubbell #7594 with a hollow center ground pin and 230 Volt units have a Hubbell #7485 with a solid center ground pin.

2.2 Drawings

A. Unit Identification

2.2.1 Unit Identification

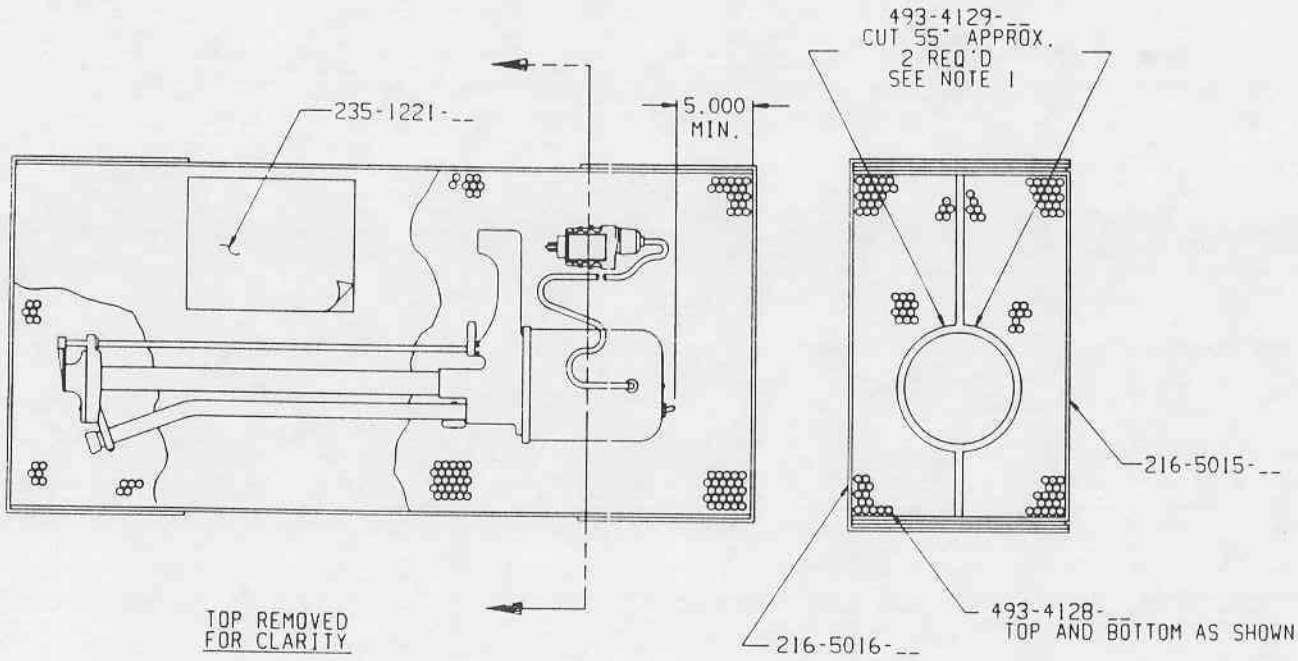


2.2.2. Packaging of Turbine

152-0500-01
ITEM NO.

152-0500-01
ITEM NO.

SYMI	CHANGES	EC	DATE
(01)	RELEASED FOR PRODUCTION	60713	11/30 88



NOTES:

1. AERATOR/EJECTOR MUST BE COVERED WITH PROTECTIVE FILM TO PREVENT FOAM FROM ADHERING TO IT.
2. MINIMUM OF 3" SPACING BETWEEN UNIT AND CARTON MUST BE MAINTAINED FOR PROTECTION.(SEE DIM. FOR EXCEPTION)
3. SECURE CARTON AT BOTH ENDS WITH STEEL BANDING.

NOTE: SHEETS 1 THRU 3 ARE "D" SIZE

FERNO
WASHINGTON INC.
70 WEIL WAY
WILMINGTON, OHIO 45177-9371

BY	DATE
DRAWN DAD	11/28 88
CHECKED R.J.	11/30 88
APPROVED SEA	11/30 88

TOLERANCE X.XXX ± .030, X.XXX ± .010, X.XXX ± .005
ANGLE ± 2°
DESCRIPTION: PACKAGING, AERATOR/EJECTOR
FINISH: NONE
SCALE: 1:8
SHEET NO.: 4 OF 4
MATERIAL: NOTED
ITEM NO.: 152-0500-01

ITEM NO. 152-0500-01

Section 3: Operation

3.1 Start-Up Procedures

3.1.1 Installation

1. Unpacking
   For all drain pump and non-drain pump units except Models 801, 1100, 1200, 1610, and similar units: Remove turbine from shelf and unpack completely.

   For Models 801, 825, 850, 1100, 1200, 1620, and similar style units: Remove turbine from box containing parts and unpack completely. Turbine for Model 1200 may be strapped to platform inside tank.

   For Pools and other units: Remove turbine from box and unpack completely.

2. Mounting (Mechanical)
   Mount turbine ejector suspension arm onto the raising and lowering device tube of unit or carriage.

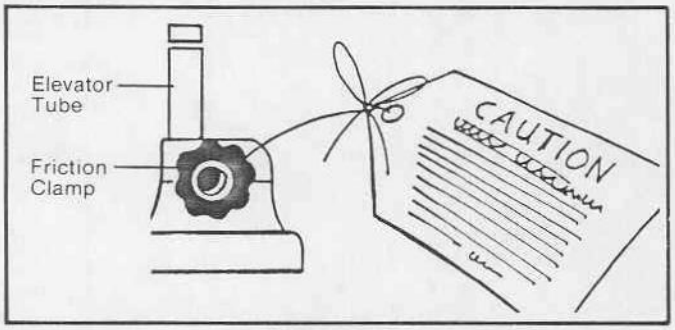


Figure 3-1

WARNING

Counterbalance tube is gas-cylinder activated. Mount turbine before loosening friction clamp knob. Tighten friction clamp knob before removing.

FAILURE TO HEED WARNING MAY RESULT IN INJURY TO PATIENT OR PERSONNEL.

For Model 1200 and 1610 Style Units: Turbine ejectors supplied with these units are mounted to a hinge assembly. This is to permit turbines to be swung over rim to outside of tank without being removed from the carriage. The hinge assembly is fastened to the turbine suspension bracket. Mount turbine ejector housing hinge into the raising and lowering device tube of the carriage.

For Pools and other tanks: Mechanical mounting is onto a bracket or a raising and lowering tube similar to the aforementioned arrangement, but bracket may have to be added to pool or tank wall.

For HM310D and Podiatry Style Units: Mount turbine on stationary turbine tube. The safety pin is not required or included with these units.

3. Motor Cap
   Do not pull foam protector off as this may cause damage to the motor cap. The tape must be cut in order to remove it.

4. Electrical Connection
   For drain pump units (all 115 Volt and all 230 Volt units): Insert the 3-prong, twist lock cord cap into the matching receptacle which is located on side of control panel shield, or base at end of tank. Depress cord cap rubber slightly and turn clockwise to lock.

For Non-Drain Pump Units (all 115 Volt units): Supply cord for non-drain pump units terminates with a ground fault circuit interrupter GFCI plug. 115 Volt—60 Hertz - 15 amp plug configuration is parallel blade "U" ground, NEMA 5-15P.

For all 230 Volt Units: These units terminate with a Hubbell #8615-C (or equal), "hospital grade" 3-prong, dead front, cord cap—tandem blade "U" ground.

WARNING

For safe operation, this unit must be properly grounded.

A grounding "hospital grade" UL approved plug cap is provided on the electric supply cord.

Grounding reliability can only be achieved when this plug cap is connected to a matching UL approved receptacle marked "hospital grade".

FAILURE TO HEED WARNING MAY RESULT IN INJURY.

Matching receptacles, as suggested on roughing-in drawing, are to be supplied and installed by others, in accordance with the national electric code as a minimum requirement. Models 801, 850, 1100, 1200, and 1610 cords are provided with a clamp for fastening to side of carriage.

CAUTION

Make certain polarity and grounding of receptacle wiring are correct.

INCORRECT POLARITY AND GROUNDING CONNECTIONS TO A RECEPTACLE MAY RESULT IN SERIOUS INJURY.

3.1.2 Step-By-Step Start-Up Procedures

1. Fill tank with tepid water to desired treatment level.

> **CAUTION**
>
> Always verify water temperature before introducing patient to water.
>
> FAILURE TO DO SO MAY RESULT IN SERIOUS INJURY TO THE PATIENT.

2. Before starting Turbine Ejector, submerge bottom housing into water. Minimum submersion depth is 2 inches above water lubricating holes.
3. The following hydromassage controls are built into each unit and can be tested as follows:

   A. Water Pressure Control
   The water control throttle lever varies the water jet stream from minimum to maximum force by pushing the lever forward (towards tank) for maximum force and pulling lever backwards (towards operator) for minimum force. Turn on the turbine by pressing the switch located on the top of the turbine housing. Rotate the water control throttle lever clockwise and counterclockwise to check the variance of the force of the jet stream. Turn turbine off.

   B. Air Volume Control
   The aerator butterfly valve varies the amount of air which is mixed into the ejected water stream. Additional air softens the force of the jet stream. Turn the turbine on. Rotate the aerator butterfly valve vertically for maximum force and horizontally for minimum force. Turn turbine off.

   C. Rotation and Elevation
   The Turbine Ejector rotates on the raising and lowering tube. Raising or lowering of the elevator tube is accomplished by adjustment of friction clamp. Releasing tension on the friction clamp, raise or lower turbine to desired height and then tighten friction clamp.

Note: Hydro-Aid and Podiatry units are mounted on a stationary tube and only have rotation control.

3.1.3 Safety Device and Monitoring Device Checklist.

Thermal Motor Protection
The Turbine Ejector motor is protected by a built-in automatic reset thermal cut-out relay. However, do not be alarmed by normal heating of the motor as it may become warm. The thermal cut-out protects the motor against damage due to mechanical or thermal overloads.

The thermal cut-out prevents damage to the motor by automatically breaking the circuit before a dangerously high temperature is reached, and the Turbine Ejector will not start to operate until the motor has cooled. However, motor will start again and stop again when overheated. This cycle will continue until the overload has been eliminated.

3.1.4 Safety Precautions

Water lubricating holes **must be kept clear** of debris. Inspect before and after each use.

If holes become clogged, surging, loss of hydroaction, and shortened bearing-shaft life can be expected.

3.1.5 Test Procedure

> **CAUTION**
>
> Refer electrical servicing to a professional electrician or a qualified service technician.
>
> Our hydrotherapy units are Underwriters' Laboratories listed. Accordingly, they will conform to the new UL "Standards for Safety—Medical and Dental Equipment" (UL 544, October 24, 1986), and are classified as "Patient Care Equipment"

Note: UL definition of "Patient Care Equipment": "Equipment that is intended to be used on or with, or likely to be contacted by, a patient in a health care facility in the course of his treatment."

"Patient Care" grounded equipment is permitted to have a maximum leakage of 100 microamperes to ground.

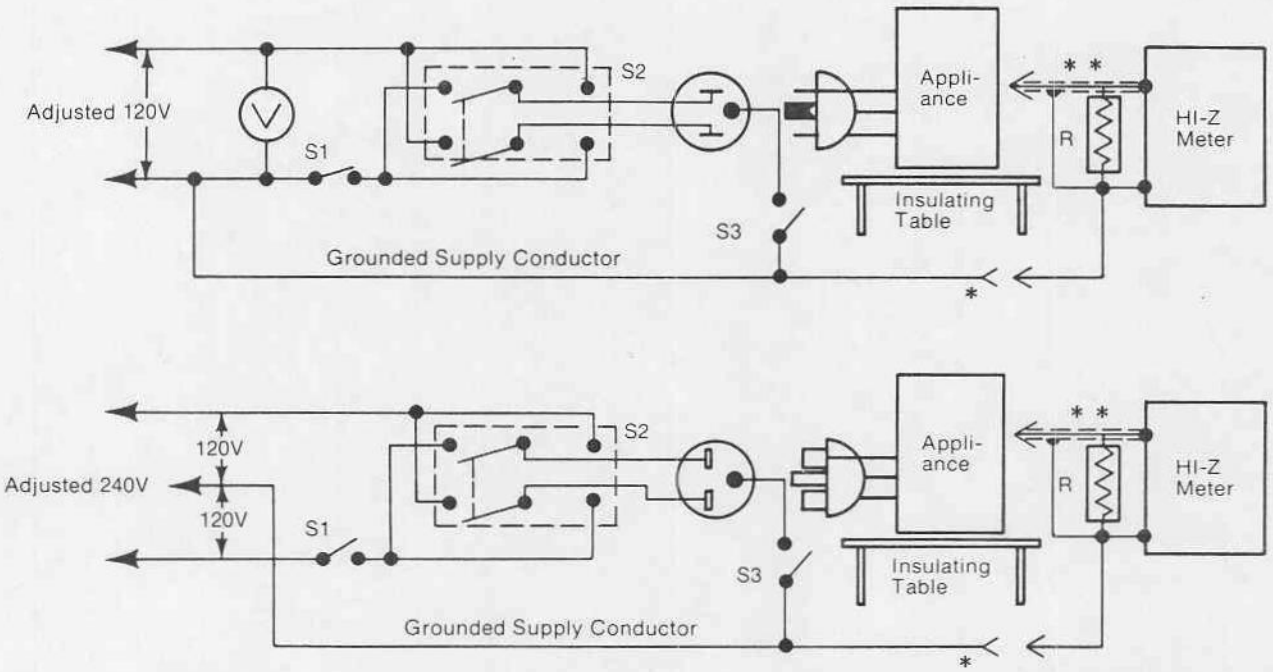
The typical leakage of our mobile hydrotherapy units is from 40 to 70 microamperes to ground when measured per UL 544. Typical leakage of our stationary hydrotherapy units is from 35 to 50 microamperes to ground.

This leakage test is performed by UL during investigation of a product. It is not a 100 percent production test performed on every unit. We are required to perform a 100 percent "dielectric strength test" on all units which we manufacture.

1. Leakage Test
   The leakage test is prescribed in UL 544 as follows:

   A. Cord-Connected "Patient Care Equipment":
   All accessible parts of a cord-connected appliance are to be tested for leakage current between the parts and between the parts and ground. When a "patient care" appliance is tested in the manner described below the maximum leakage current, for grounded equipment, shall not exceed 100 microamperes.

Current Leakage Testing Diagram



Notes: *Separated and used as clip when measuring voltages (currents) from one part of appliance to another. (Connected at all other times.)

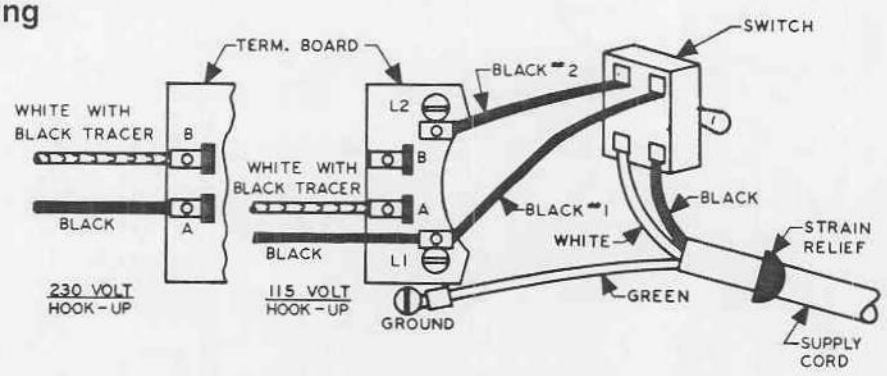
**Probe with shielded lead.

R = Resistive input impedance — 1000 ohms.

HI-Z-Meter — The meter is to be average-responding and indicate RMS value of a pure sine wave within all overall measuring circuit error of not more than 5 percent at indications of 10, 50, 100 and 500 microamperes (10, 50, 100 and 500 millivolts, respectively, when using a 1000 OHM resistor) at frequencies from 10 Hz to 100 KHz.

Figure 3-2

Receptacle Wiring



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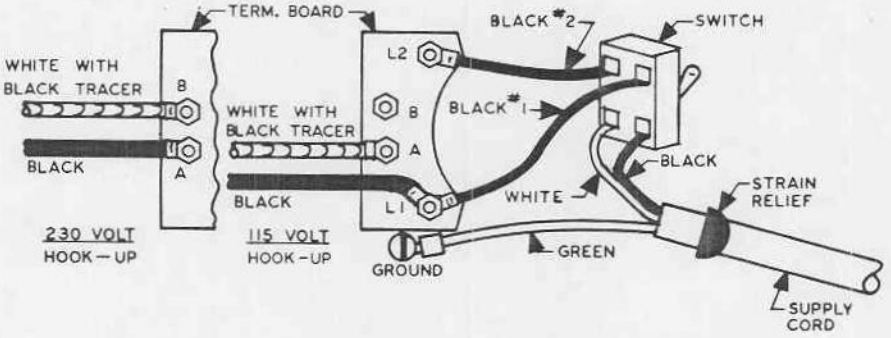

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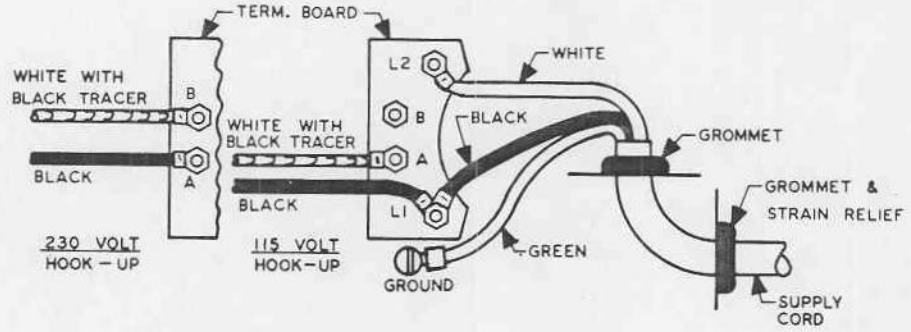

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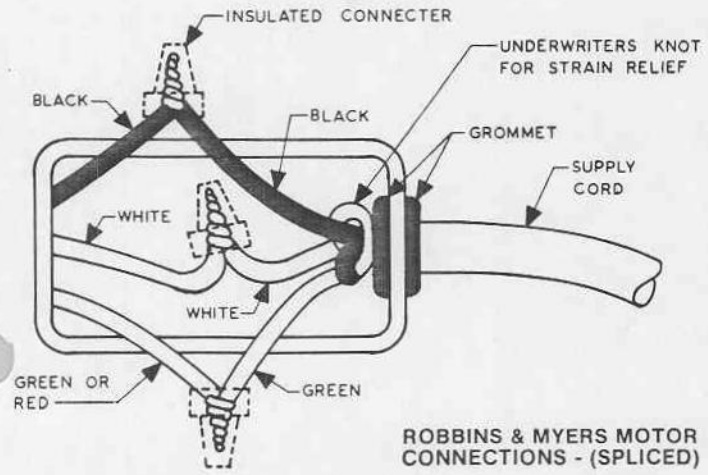
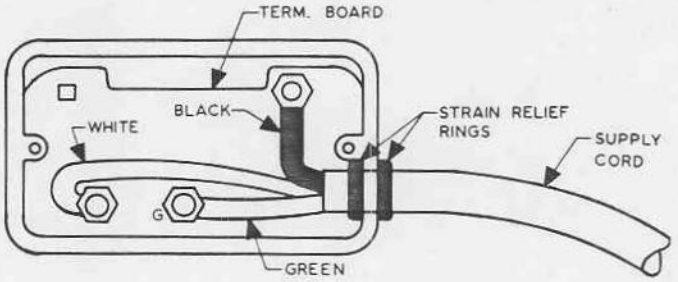


ROBBINS & MYERS MOTOR
CONNECTIONS - (SPLICED)



ROBBINS & MYERS MOTOR
CONNECTIONS - (TERMINAL BOARD)

Figure 3-3

In making the leakage measurement, a single fault condition (the loss of ground in a cord-connected appliance) likely to increase the leakage current shall be introduced.

B. Procedure:
A sample of the appliance shall be tested for current leakage as indicated. Starting with the "as received" condition, the test sequence, with reference to the measurement circuit in Figure 3-2 shall be as follows:

1. With switch S1 closed to energize the appliance, leakage current shall be determined using both positions of switch S2, with the appliance switching devices in all their normal operating positions, and with switch S3 in both the open and closed positions.

2. Leakage current shall be monitored at sufficient intervals to determine the maximum leakage current from the time of the previous measurement to the conditions under which the normal temperature test would be terminated. A test period of three minutes should be sufficient to detect any excessive leakage. Both positions of switch S2 shall be used in determining this measurement.

Figure 3.3 illustrates the type of meter and switching arrangement required for measuring current leakage. Many meters with switching arrangement and resistance built in are available commercially.

A few of the manufacturers of meter assemblies, for testing current leakage, are listed for your reference and convenience:

Bio-Design, Inc.
Stoughton, Mass. 02072

Simpson Electric Co.
Chicago, IL 60644

2. Dielectric Strength Test
The dielectric strength, which is applied to every unit at the time of manufacturing, is described as follows:

1. Insulation and spacing of an appliance shall be capable of withstanding an alternating 60Hz potential of 1000 Volts (plus two times rated voltage) for a period of one minute when applied across current-carrying parts and accessible metal.

2. Insulation testing or dielectric strength testing devices are commercially available. A few of the manufacturers are listed for reference and convenience:

Ideal Industries, Inc.
Sycamore, IL

Slaughter Co.
Ardmore, OK 73401

3. Even though every effort has been made to provide you with a safe, reliable hydrotherapy unit in accordance with Underwriters' Laboratories Standards, your hydrotherapy unit requires care and maintenance to keep it safe during the many years that it will serve you.

3.2 Operator Data

3.2.1 Detailed Operating Description

Note: It is not the intention of Ferno Ille to attempt to direct the clinical care of your patient but to advise you in the proper use of Ferno Ille equipment to maximize the quality of your clinical care.

WARNING

Hydrotherapy units are not intended for use with "electrically susceptible patients".

FAILURE TO HEED WARNING MAY RESULT IN INJURY.

1. Fill tank with tepid water to desired treatment level and render tank operational.

The electric turbine ejector and aerator ejects approximately 45 gallons of water per minute and produces a vigorous hydromassage to the patient. This action soothes sore muscles, increases local circulation, and enhances edema reduction.

This action also provides a safe, non-traumatic method of wound cleaning and debridement.

When giving hydrotherapy treatment, the tolerance of the patient must be taken into consideration. This tolerance is dependent upon the patient's subjective feelings, the patient's physical and medical condition, and the patho-physiology of the area to be treated.

The water temperature used during a hydrotherapy treatment is usually specified by a physician or physical therapist. It can vary from the lower temperature spectrum (approximately 65°F) where a cryotherapeutic response is desired, to the higher temperature spectrum (96°-104°F) where a thermo-therapeutic response is desired.

Note: Temperature of water feels hotter when it is moving compared to when it is still.

All hydrotherapy treatments should be monitored until the desired temperature range is established. The average treatment time suggested is 20-30 minutes.

2. Immerse patient or body part into water.
3. Pre-position direction of turbine jet stream. The turbine can be raised or lowered by means of a counterbalanced elevator and it can rotate in a horizontal plane when positioned at any level. This enables the clinician to direct the water flow at or near the body part being treated.
4. The force of the underwater stream (hydromassage) is readily variable from minimum to maximum by turning the water throttle control lever, located directly under the motor support bracket. The pressure exerted by this force is controlled by varying the volume of air being mixed with the underwater stream by moving the aerator butterfly valve to an open or closed position. The more air introduced, the softer the pressure.

WARNING

Improper use or lack of attention may allow hair, clothing, or other objects to be drawn into the turbine ejector causing injury to the patient or personnel, and damage to the equipment.

5. Activate turbine.

WARNING

Hydrotherapy treatments should be monitored throughout the duration of the treatment. Patient, patient's position, and equipment should be constantly checked.

FAILURE TO DO SO MAY RESULT IN INJURY TO PATIENT AND/OR DAMAGE TO EQUIPMENT.

6. Upon completion of treatment, turn off turbine and position it out of the patient's way. Remove patient.
7. Clean and disinfect turbine.

   The turbine ejector is fabricated of bronze castings with a stainless steel tube and control rod. Polished chromium plating is applied to the bronze castings for sanitary purposes.

   Foreign matter is deposited onto turbine ejector in the form of film every time it is used. The film is generated by body oils, minerals in the water, organic deposits, and other foreign matter. If film is left on the turbine, eventually the foreign particles will cause corrosion, leaving pit marks in the surface of the chromium plating.

Even more important than appearance are bacteriological infection problems that may develop through contamination of water, equipment, and inappropriate treatment procedures. Treatment water may include Chlorazene® Whirlpool Antiseptic to maintain low bacterial levels. Experience and common sense dictate that the water should be changed completely after each treatment. The turbine should then be cleaned and sanitized with Sanizene® Hard Surface Disinfectant and rinsed with hot water.

Acid-alkaline balance: water in your tubs should be approximately 7.4-7.8 for best corrosion resistance.

CAUTION

If chlorides are used, maintain the lowest concentrations for the intended purpose. Chloride ions are the major cause of pitting and intergranular corrosion. However, Chlorazene has been tested safe for stainless steel because of its slow release of chlorine.

Turbine ejector cleaning and sanitizing is very similar to tank sanitizing. Please refer to Section 4.

3.3 Shutdown Procedures

A. Normal Shutdown:
   The normal procedure for shutting down the turbine is to throw the operating switch located at the top of the unit housing to the "OFF" position.

B. Emergency Shutdown:
   Throw the operating switch, at the top of the unit housing to the "OFF" position;

   OR disconnect turbine power supply cord from wall receptacle, base of unit, or switch shield.

C. Thermal Motor Protection:
   The turbine ejector motor is protected by a built-in automatic reset thermal cut-out relay. However, do not be alarmed by normal heating of the motor as it may become warm. The thermal cut-out protects the motor against damage due to mechanical or thermal overloads.

   The thermal cut-out prevents damage to the motor by automatically breaking the circuit before a dangerously high temperature is reached, and the turbine ejector will not start to operate until the motor has cooled. However, motor will start again and stop again when overheated. This cycle will continue until the overload has been eliminated.

Section 4: Maintenance and Repair

4.1 Maintenance Schedule

An electrical safety maintenance program should be established in accordance with your institution's standards.

The frequency of this inspection will vary with the conditions in your hospital such as patient load and type of treatment.

Following is a suggested electrical safety inspection/ maintenance program for an average patient load.

A. Biannual
Leakage current test or dielectric strength test (or both) as described in Section 3.1.

B. Annual

1. Cord Caps
   a. Cord cap plugs on units supplied prior to September 30, 1980, should be replaced with a "dead front" cord cap plug (hospital grade, UL approved)

      For 15A-125V, use Hubbell #2815C or equivalent

      For 20A-125V, use Hubbell #8315C or equivalent

      For 15A-250V, use Hubbell #8615C or equivalent

   b. Turbine ejector cord caps of mobile units, trainers aid, and podiatry units have "dead front" cord caps. Check rubber cover on these caps for possible cracks.

   c. Turbine ejector cord caps for Model 1200 and 1610 units have "dead front" cord caps. Check rubber cover on these caps for possible cracks.

WARNING

For safe operation, the polarity of wires and cord cap plug terminals must match:
green wire to green screw
black wire to brass screw
white wire to nickel screw
FAILURE TO HEED WARNING MAY RESULT IN INJURY.

2. Supply Cords:

Note: Always disconnect electric supply cord prior to inspection or servicing.

   a. Stationary Units
      Inspect turbine ejector supply cord for flexibility, possible cuts, and possible abrasion of outer insulation. Damaged or brittle cords should be replaced. Ferno Ille can supply replacement cord assemblies at a nominal cost.

   b. Mobile Units (trainers aids and podiatry)
      These units have an electric supply cord for the unit, and an electric supply cord for the turbine ejector. Inspect both cords as in.

WARNING

Supply cords should be replaced by a professional electrician. Always connect supply cord wires to proper terminal. Never join the ground (green wire) to the neutral (white wire).

FAILURE TO HEED WARNING MAY RESULT IN INJURY.

3. Turbine ejector (refer to Figure 4-1)

   Throw turbine ejector switch, at top of motor, to OFF position. Disconnect the turbine power supply cord from wall receptacle, base of unit, or switch shield. Push turbine down to lock pin position, and insert lock pin.

   1. Remove nylon screw (item 2).
   2. Remove switch seal cap (item 3). Only grip hexagon when loosening or tightening. If rubber is fractured, order a new seal (Ille #093-8556-00).
   3. Slowly slip off motor cap (item 5).
   4. Remove motor canopy to position shown in photo.
   5. Check all connections. Make certain they are secure.

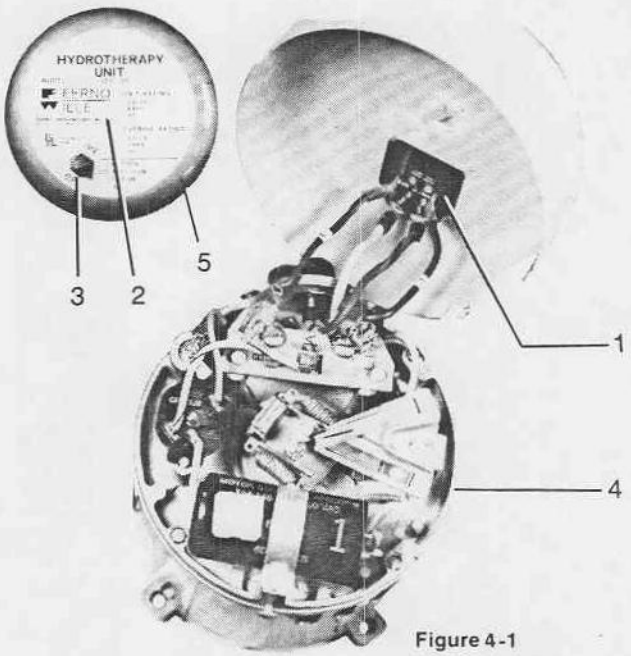


Figure 4-1

4. Your Building's Electric Receptacles

Note: For safe operation hydrotherapy units must be properly grounded. Grounding reliability can only be achieved when your hydrotherapy unit, electric supply cord plug cap, is connected to a matching UL approved receptacle marked "hospital grade".

a. Polarity and Ground Receptacles
Make certain polarity and grounding of your receptacle wiring are correct. Incorrect polarity and ground connections to a receptacle may result in serious injury.

Note: An outlet testing device (Hubbell #5200 or equivalent) may be used for this purpose.

b. Location of Receptacle

1. Is your receptacle located in a position to avoid an upward pull, a downward pull, or a sideward pull upon the cord plug cap of the electric supply cord?

2. If not, consult our electrician concerning the possibility of installing a properly grounded, polarized twist lock cord cap and receptacle.

WARNING

Hydrotherapy units are not intended for use with "electrically susceptible patients".

UL definition of electrically susceptible patient: "A patient being treated with an externalized electrically conductive device (for example, a probe or a catheter) indwelling or implanted and terminating on or in the heart".

FAILURE TO HEED WARNING MAY RESULT IN INJURY.

4.2 Major Overhaul of Turbine

4.2.1 Disassembly and Cleaning

1. Disconnect the electric supply cord.

Note: Lift turbine from fixture on tank. Be sure safety pin is inserted in raising and lowering device.

2. Remove water control rod assembly.
3. Remove aerator tube assembly.
4. Remove bottom impeller cover (4) #8-32 screws.
5. Remove cotter pin from end of stainless steel shaft inside bottom housing. Pull impeller off.
6. Remove motor cap assembly.
7. Remove motor mounting bolts (4) 3/8-16 hex head bolts from suspension bracket.
8. Pull motor including impeller shaft out of turbine tube.
9. Shaft can now be removed from motor by loosening two set screws on shaft coupling. At this time, you should also perform any needed maintenance or repair on your motor, especially making sure all electrical and wiring connections are in good repair.
10. Teflon or rubber bearing units on impeller side of housing. Remove retaining ring. Bearing should be pushed out from reverse side by using the turbine shaft. A new rubber bearing can now be inserted. Sprinkle bearing with a little talc powder and press into position. Do not force. Place the retaining ring back into position.
11. All parts can now be cleaned and checked for needed repairs or replacement parts.
12. To reassemble, just reverse above process.

Note: When assembling motor and shaft to housing assembly, tighten two bolts only. Place impeller on shaft and align cotter pin holes. The impeller should have a 3/32" clearance from pump housing. Tap shaft with soft hammer to make this adjustment. Take assembly apart once more to tighten coupling set screws to motor shaft. Reassemble.

CAUTION

Never try to remove turbine housing or suspension bracket from turbine tube. These are press fit and cannot be removed.

After assembling turbine ejector, spin impeller. The impeller wheel must spin freely.

4.3 See 4.1—Preventive Maintenance Schedule

4.4 Troubleshooting Guide

NOTE: ALWAYS DISCONNECT ELECTRIC SUPPLY CORD PRIOR TO SERVICING.

CAUTION

Refer electrical servicing to a professional electrician or a qualified service technician.

1. Turbine stops while operating.
   A. When your turbine ejector motor stops while operating, or stops and starts, and the motor cap or motor is extremely hot, the automatic thermal overload cut-out has, most likely, interrupted power supply to motor.

   B. Throw turbine ejector switch, at top of motor, to OFF position. Disconnect turbine power supply cord from wall receptacle or unit receptacle. Remove turbine from wall bracket or elevator tube and place in a convenient position. Remove four screws and lift off housing cover. Examine impeller wheel and remove any gauze, tape, or foreign material present. Spin impeller to make certain shaft rotates freely. If it does, reassemble cover, mount turbine, and proceed to operate turbine.

   C. If impeller does not spin freely, it may be necessary to replace the impeller bearing (part #911-4700-00) and in some cases, the shaft assembly (#093-8308-00 or 093-8307-00 or 093-8306-00). These parts will wear out over a long period of use and can be secured from this company or your dealer. See figure for description of parts. Bearing and shaft wear is accelerated by operating turbine without water.

CAUTION

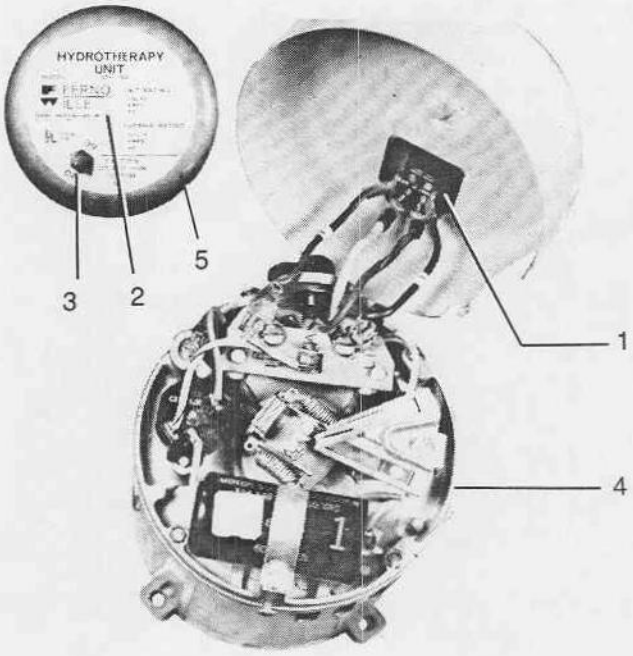
Model 100 water lubricating holes must be kept clear of debris. Inspect before and after each use. If holes become clogged, surging, loss of hydro action, and shortened turbine life can be expected.

2. Turbine does not start when switch is turned on:
   A. Check power source to make certain blown fuse or circuit breaker has not interrupted supply.

   B. Check turbine switch to determine if it is faulty. Refer to figure.

CAUTION

Always disconnect electric supply cord prior to servicing.



1. Remove nylon screw (item 2).
2. Remove switch seal cap (item 3). Only grip on hexagon when loosening or tightening.
3. Slowly slip off motor (item 5) cap.
4. Remove motor cover to position shown in photo.
5. Place continuity tester probes across two sets of switch terminals. If movement of switch toggle does not indicate continuity, switch is defective.

CAUTION

Switch is compact, and has a special spring-action toggle. Replacements are available from Ferno Ille at a nominal cost.

Refer to figure.

Order switch part #093-8556-00.

6. Replace cover of motor.
7. Slide motor cap (item 5) over motor. Hold supply cord directly in a vertical line from its connector. Index motor cap on switch, reassemble screw (item 2), and switch seal (item 3).

4.5 Repair Procedure

Service Engineering Company is the only authorized Ferno Ille service dealer. They have a network of service agencies across the United States to provide prompt service. To contact them, call or write:

Service Engineering Company
P.O. Box 25021
Raleigh, NC 27611
1-800-334-5528

For questions about items under warranty, you may also contact Ferno Ille Customer Service at:

Ferno-Washington, Inc.
70 Weil Way
Wilmington, OH 45177-9371
(513) 382-1451
Fax: (513) 382-1191

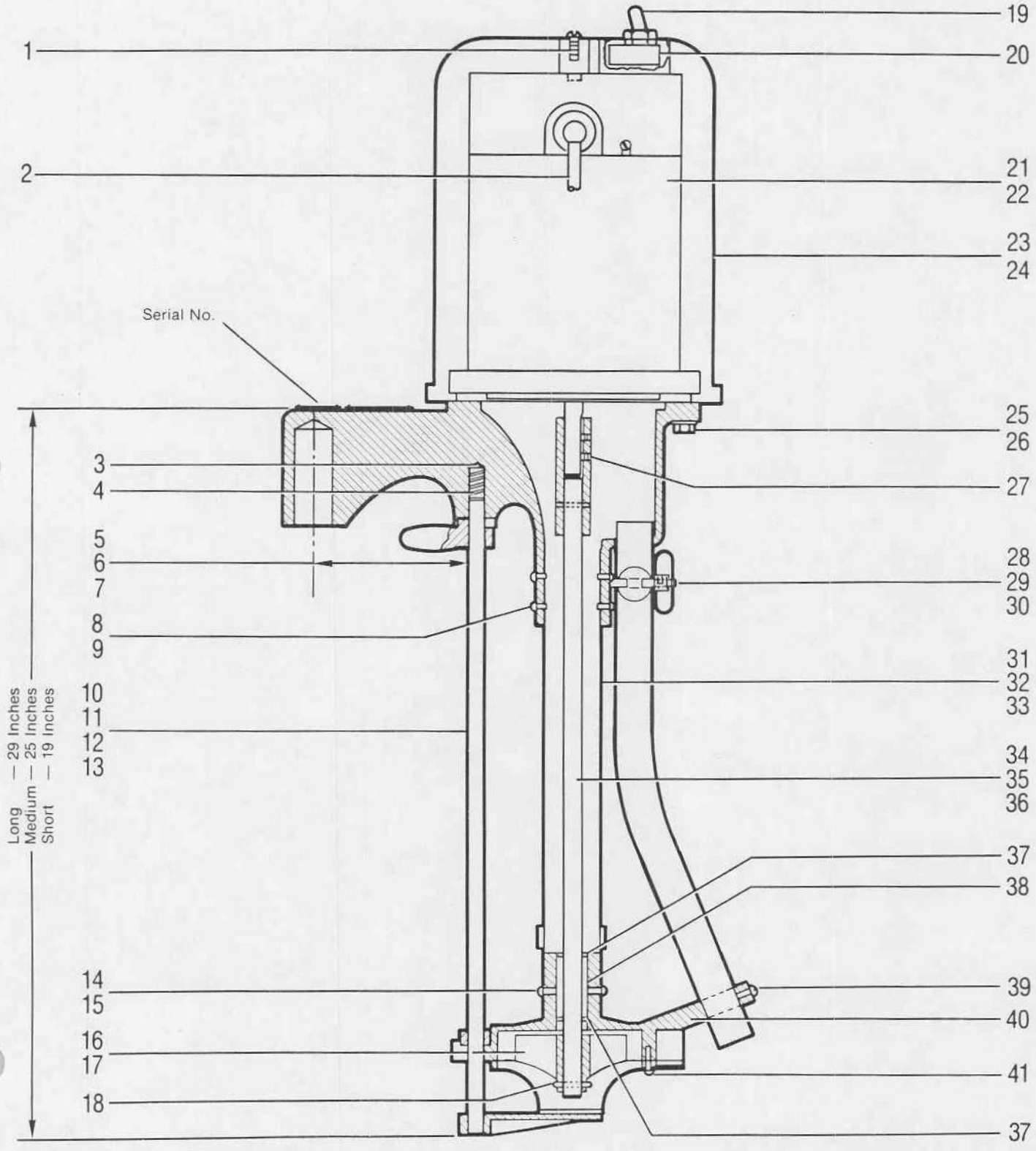
Product Name _____ Model _____ Serial # _____

Date Purchased _____ Purchased From _____

Date Placed In Service _____

Date	C	L	I	P	Comments/Problems/Disposition	Initials

Parts List Information
Turbine Ejector and Components



Index No.	Part No.	Description	No. Req'd.
1	903-8089-00	Screw, Nylon 1/4-20 × 1/2″ Long	1
2	———————	Attachment Cord (Specify Serial No. and Voltage)	1
3	093-8336-00	Spring Slug	2
4	093-8376-00	Spring	1
5	093-8486-00	Suspension Bracket - Painted, 6-3/4″ Long	1
6	093-8490-00	Suspension Bracket - Painted, 4-1/8″ Short	1
7	093-8498-00	Suspension Bracket - Painted, 2-1/4″ Extra Short	1
8	093-8087-00	Screw, 8-32 × 3/8″ Long Rd. Hd.	4
9	911-6194-00	Lockwasher, 3/8″ Split	4
10	093-9556-00	Water Control Rod Assembly, Long	1
11	093-9566-00	Water Control Rod Assembly, Medium	1
12	093-9676-00	Water Control Rod Assembly, Short	1
13	093-9586-00	Water Control Rod Assembly, PHM Series	1
14	093-8087-00	Screw, 8-32 × 3/8″ Long, Rd. Hd.	2
15	911-5904-00	Lockwasher #8 Shakeproof	2
16	093-4851-00	Impeller, 50/60 Hz Standard Units	1
17	093-4856-00	Impeller, 50/60 Hz Podiatry	1
18	093-6910-00	Cotter Pin, 1/8 × 1-1/4″ Long	1
19	093-8546-00	Switch Cap	1
20	093-8556-00	Switch	1
21	093-5751-00	Electric Turbine Motor, 48 Frame, 60 Hz (Specify Serial No.)	1
22	093-5753-00	Electric Turbine Motor, 48 Frame, 50 Hz (Specify Serial No.)	1
23	093-5791-00	Motor Cap Assembly, 60 Hz, 48 Frame-Painted	1
24	093-5793-00	Motor Cap Assembly, 50 Hz, 48 Frame-Painted	1
25	911-5903-00	Bolt, 3/8-16 × 1-1/4″ Long, Hex Hd	4
26	911-6194-00	Lockwasher, 3/8″ Split	4
27	093-8090-00	Screw, Set 10-32 × 1/4″ Long	2
28	093-8878-00	Aerator Tube Assembly, Long, 24-1/8″ Long	1
29	093-8877-00	Aerator Tube Assembly, Medium, 20-1/16″ Long	1
30	093-8876-00	Aerator Tube Assembly, Short, 14-1/16″ Long	1
31	093-9166-00	Turbine Tube, Long, 22-1/4″ Long	1
32	093-9156-00	Turbine Tube, Medium, 18-1/4″ Long	1
33	093-9146-00	Turbine Tube, Short, 12-1/4″ Long	1
34	093-8308-00	Shaft and Coupling Assembly, Long, 27-1/2″ Long	1
35	093-8307-00	Shaft and Coupling Assembly, Medium, 23-1/2″ Long	1
36	093-8306-00	Shaft and Coupling Assembly, Short, 17-1/2″ Long	1
37	093-7996-00	Retainer Ring (Set of 2)	1
38	093-0128-00	Bearing Rubber w/Cotter Pin	1
39	093-8088-00	Screw, 8-32 × 1/2″ Long Rd. Hd.	1
40	093-4836-00	Turbine Housing Cover Assembly*	1
41	093-8088-00	Screw, 8-32 × 1/2″ Long Rd. Hd.	4

*Only sold as an assembly—includes housing, cover, guard cover, (7) screws, (2) lockwashers. Screws are brass. chromium plated.
When ordering parts, always include serial number, description of part and part number - if available.

4.6 Supplies

4.6.1 Steelscrub

Health Hazard Data

Threshold Limit Value	Not Applicable
Effects of Overexposure	Can be absorbed through skin, to cause kidney damage (contact with large quantities for extended periods)
Emergency and First Aid Procedures	Get in Eyes: Flush with water for 15 minutes. If irritation persists, contact physician If Contact With Skin: Wash immediately to avoid absorption. If taken internally, induce vomiting.

Reactivity Data

Unstable	Keep away from heat and acids
Incompatibility	Not Applicable
Hazardous Decomposition Products	Chlorine, Carbon Monoxide
Hazardous Polymerization	Will not occur

Spill or Leak Procedures

Steps to Be Taken	If spilled, material may be washed down with water, then absorbed with sweeping compound
Waste Disposal Method	Transport to Landfill

Special Protection Information

Respiratory Protection	Not Applicable
Ventilation	Not Applicable
Protective Gloves	Wear gloves
Eye Protection	Wear Eye Protection

Special Precautions

Handling and Storing	Under normal conditions, product is not hazardous and requires no special handling

4.6.2 Medifome

Identification

Manufacturer's Name	Clarkson Chemical Company Inc. 213 Main Street So. Williamsport, PA 17001
Chemical Name and Synonyms	Not Applicable
Trade Name and Synonyms	Medifome
Chemical Family	Detergent
Formula	See below

Hazardous Ingredients

Pigments	Not Applicable
Catalyst	Not Applicable
Vehicle	Not Applicable
Solvents	Not Applicable
Additives	Not Applicable
Base Metal	Not Applicable
Alloys	Not Applicable
Metallic Coating	Not Applicable
Filler Metal	Not Applicable
Hazardous Mixtures of Other Liquids, Solids or Gases	TLV (units)
Thymol Crystals	0.06%
Oil of Eucalyptus	0.15%
Methyl Silicate	0.15%
Oil of Thyme	0.07%
Hexametaphosphate	4.10%
Pine Oil	1.60%
Suphonated Caster Oil C-75	24.00%
Caustic Potash	0.16%
Water	70.00%

Physical Data

Boiling Point (°F)	212°
Vapor Pressure	Not Applicable
Vapor Density (Air = 1)	Not Applicable
Solubility in Water	Very Good
Specific Gravity (H_2O = 1)	Not Applicable
Percent Volatile by Volume	Not Applicable
Evaporation Rate	Not Applicable
Appearance and Odor	Green—Wintergreen Pine

4.6.3 Chlorazene

Health Hazard Data

Threshold Limit Value	Not Applicable
Effects of Overexposure	Not Applicable
Emergency and First Aid Procedures	Rinse eye(s) with running water for at least 15 minutes. Seek medical attention. Wash skin with soap and water, rinse well. Inhalation, seek fresh air and rest, seek medical attention. Swallowing, water and active charcoal. Seek medical attention.

Reactivity Data

Stable	Under 35°C
Conditions to Avoid	Do not store above 35°C, store away from heat.
Incompatibility	Acids, c12
Hazardous Decomposition Products	With acids c12 results, thermal decomposition, smoke but no fire
Hazardous Polymerization	Decomposition sets in within 15 minutes at 130°C under foaming

Spill or Leak Procedures

Steps to be Taken	Sweep up, avoid dust
Waste Disposal Method	Add to a solution of sodium thiosulfate or sodium sulfite, this decomposes the material to harmless tolueane sulfonamide.

Special Protection Information

Respiratory Protection	Dust filters
Ventilation	Local exhaust
Protective Gloves	Wear gloves
Eye Protection	Not Applicable

Special Precautions

Handling and Storing	Do not store above 35°C.

4.6.4 Sanizene

Health Hazard Data

Threshold Limit Value	Not Applicable
Effects of Overexposure	Eyes—causes eye damage Skin—causes severe skin irritation. Ingestion—harmful or fatal if swallowed.

Emergency and First Aid

Procedures	Eyes—immediately flush eyes with plenty of water for 15 minutes. Call a physician immediately. Skin—immediately flush skin with plenty of water for 15 minutes. Ingestion—drink promptly a large quantity of milk, egg whites, gelatin solution or large quantity of water. Get medical attention.

Reactivity Data

Stable

Incompatibility	Acids
Hazardous Decomposition Products	None
Hazardous Polymerization	Will not occur.

Spill or Leak Procedures

Steps to be Taken	Mop or flush with water. Avoid contamination of food, water or feed.
Waste Disposal Method	If waste cannot be disposed of by use according to label instructions, contact your state pesticide or environmental control agency or the hazardous waste representative at the nearest EPA Regional Office for guidance.

Special Protection Information

Respiratory Protection	None
Ventilation	Not Applicable
Protective Gloves	Wear gloves
Eye Protection	Goggles or face shield.

Precautions

Handling and Storing	Do not contaminate water, food or feed by storage or disposal. Open dumping is prohibited. Do not reuse empty container.

Section 5: Warranty

This equipment has been carefully inspected and tested and is fully covered by the Ferno Ille guarantee provided the Warranty Card is mailed within ten days from receipt of product.

Ferno Ille will guarantee all Ferno Ille equipment to be perfect in material and workmanship. We agree to replace free of charge any part that may be found defective if this part is returned to us, transportation charges prepaid, within one year from date of purchase. This service guarantee is not to be construed to cover willful neglect or misuse and does not apply to standard electrical equipment, lamps, bulbs, switches, receptacles, etc.

Ferno Ille cannot assume responsibility for repairs made by others.

FERNO
IIIe

A Division of
FERNO-WASHINGTON, INC.
70 Weil Way
Wilmington, OH 45177-9371
Phone: 513/382-1451

Part No. 234-1155-00

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Printed in U.S.A.

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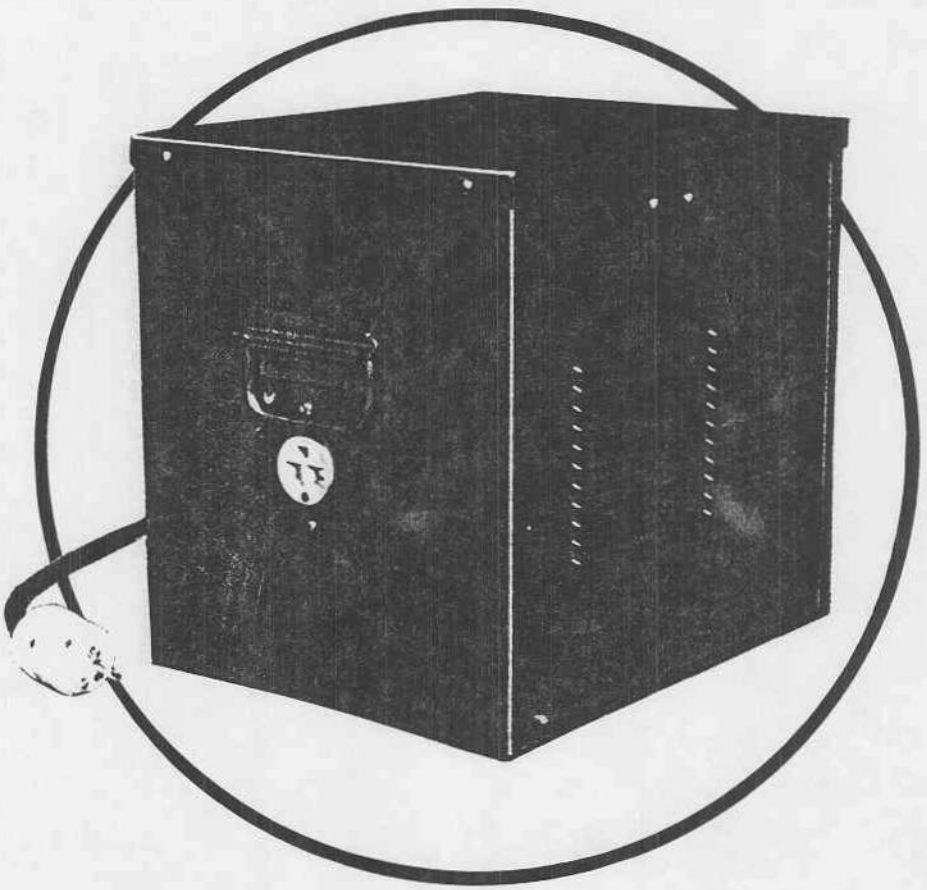
IIIe

Electrical Converter

Operation and Maintenance Manual



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Section 5: Warranty

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NOTE: Due to our Constant Improvement Program, Units are Subject to Change Without Notice.

Section 2: Equipment Data and Drawings

Section 2: Equipment Data and Drawings

2.1 Electrical Converter, part number 152-1645-00.

The Electrical Converter allows Government Model 200 Hydrotherapy Tank and Turbine system to operate on either 115 VAC, 50 or 60 Hz or 220 VAC, 50 or 60 Hz normal electrical supply.

2.1.2 Specifications:

Length: 11.870 inches
Width: 9.50 inches
Height: 11.072 inches
Weight: 80.75 lbs.

2.1.3 Electrical Characteristics

Output: Voltage: 110 - 125 Volts
Current: 20 Amps
Frequency: 50/60
Single phase

Input: Voltage: 220 - 250
Current: 10 Amps
Frequency: 50/60
Single phase

WARNING
Hydrotherapy units are not intended for use with "electrically susceptible patients".

FAILURE TO HEAD WARNING MAY RESULT IN INJURY.

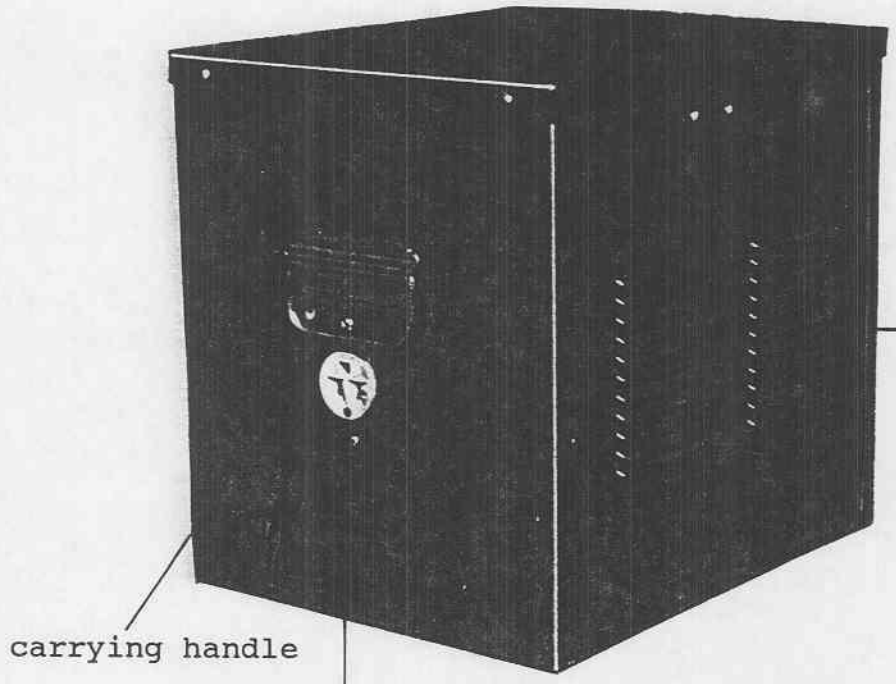
Definition of "Electrically Susceptible Patients":
According to U.L. standards, electrically susceptible patients are patients being treated with an externalized electrically conductive device (for example, a probe or catheter) indwelling or implanted and terminating on or in the heart.

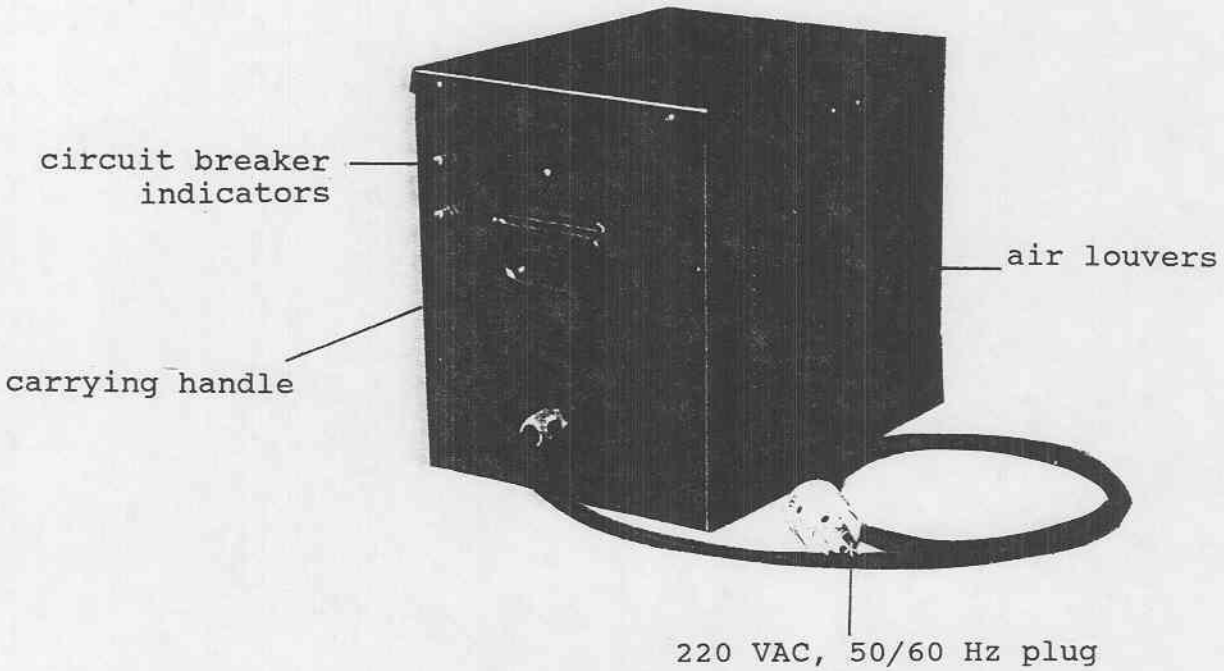
This equipment is intended only for professional use where the patient will be under the supervision of trained personnel.

WARNING
This unit must be kept in a dry area out of the reach of the patient. Operator must have dry hands before connecting or disconnecting this unit.
FAILURE TO DO SO COULD CAUSE SERIOUS INJURY OR DEATH TO OPERATOR OR PATIENT.

2.2 Drawings

2.2.1 Unit Identification



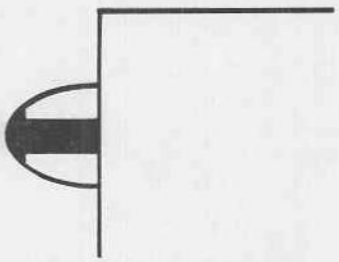


2.2.2 Plug Identification

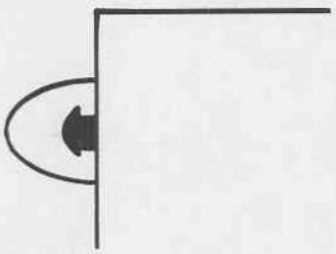
120 plug configuration

220 plug configuration

2.2.3 Circuit Breaker

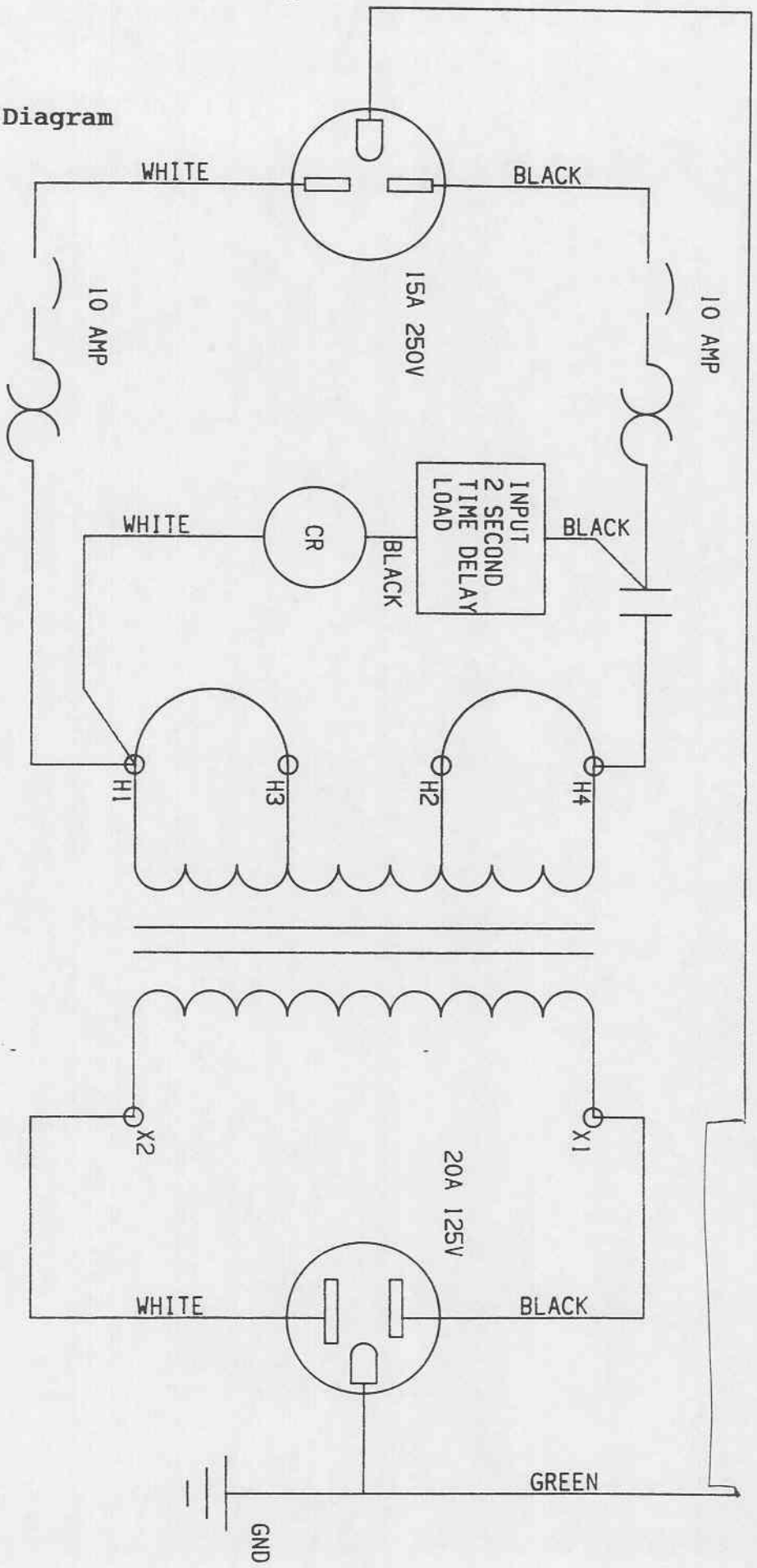


circuit breaker tripped

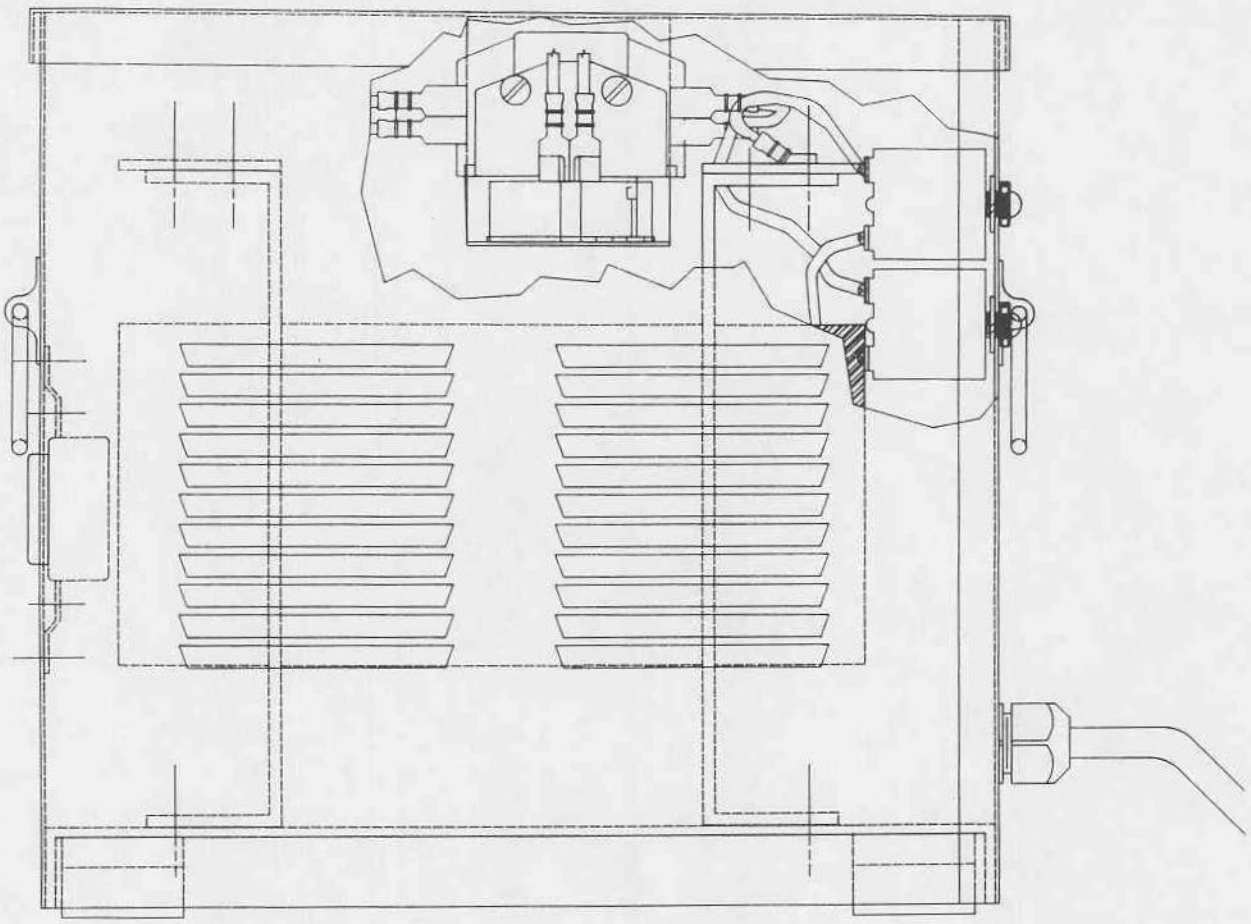


circuit breaker normal

2.2.4 Wiring Diagram



2.2.5 Schematic



Section 3: Operation

Section 3: Equipment Operation

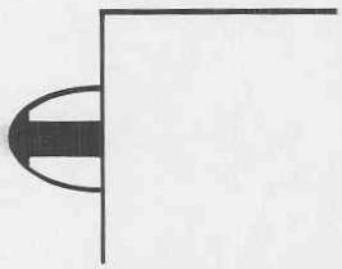
3.1 Start-Up

3.1.1 Unpacking

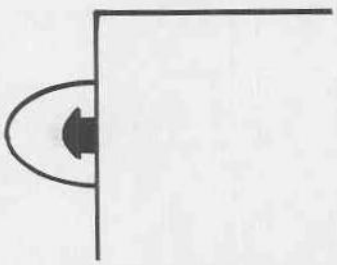
Carefully remove outer carton. Remove inner packing material.

3.1.2 Pre-Start Check List

1. Check circuit breakers. Tripped circuit breaker is indicated by a red indicator under one (or both) of the rubber domes. To connect circuit, depress the rubber dome. Red indicator will be recessed into unit.



circuit breaker tripped



circuit breaker normal

Figure 3-1

3.1.3 Start-Up

1. Plug Electrical Converter into electrical supply.

3.1.4. Safety Device and Monitoring Device Checklist.

1. The Electrical Converter is protected by a built-in manual reset thermal overload protector. However, do not be alarmed by normal heating of Electrical Convertor as it may become warm.

The thermal overload protects the Electric Converter against damage due to thermal overloads. The thermal overload prevents damage to the Electric Converter by automatically breaking circuit before dangerously high temperature is reached.

3.1.5 Safety Precautions

1. Check for frayed wires
2. Do not open Electrical Converter
3. Do not stick anything into the louvers of the Electrical Converter
4. Do not place Electrical Converter near water or on a wet surface

3.2 Operator Data

WARNING:
Hydrotherapy units are not intended for use with electrically susceptible patients.
FAILURE TO HEED WARNING MAY RESULT IN INJURY.

WARNING:
This unit must be kept in a dry area out of the reach of patients. Operator must have dry hands before connecting or disconnecting this unit.

FAILURE TO DO SO COULD CAUSE SERIOUS INJURY OR DEATH TO OPERATOR OR PATIENT.

1. Plug turbine ejector into hydrotherapy tank unit.
2. In locations where 115 VAC, 50 or 60 Hz is the normal electrical supply, the hydrotherapy tank can be directly plugged into the wall receptacle for 115 VAC, 50 or 60 Hz. The plug and wall receptacle for 115 VAC, 50 or 60 Hz will appear as in Figure 3-2.
3. In locations where 220 VAC, 50 or 60 Hz is the normal electric supply, the Electrical Converter is plugged into the wall receptacle and the hydrotherapy tank is plugged into the Electrical Converter. The plug and wall receptacle for the 220 VAC, 50 or 60 Hz will appear as in Figure 3-3.

Figure 3-2

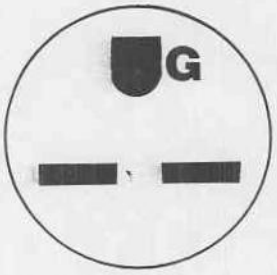


Figure 3-3

3.3 Shutdown Procedures

3.3.1 Normal Shutdown Procedures

1. Turn off tank and turbine.
2. Disconnect tank from Electrical Converter.
3. Disconnect Electrical Converter from wall receptacle.

3.3.2 Emergency Shutdown

Same as 3.3.1

Section 4: Maintenance and Repair

4.1 Preventive Maintenance Schedule
Regularly check cords for wear.

4.2. Major Overhaul Schedule
No overhaul schedule

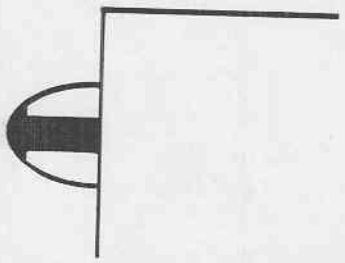
4.3. Maintenance Procedures
The Electrical Converter will need occasional cleaning of its outer shell.
1. Unplug tank from Electrical Converter.
2. Unplug Electrical Converter from wall receptacle.
3. Use Sanizene (TM) Hard Surface Disinfectant in solution (see instruction on container), soap or detergent in solution. With soft cloth, wipe entire surface area. Wipe solution off with damp cloth and towel dry.

4. To Remove Stubborn Spots and Stains
Use a good stainless steel cleanser such as Ille Steelscrub and vinegar. Scrub the area with a cloth, sponge, stainless steel wool or cleaning pad. Let stand for approximately five minutes. Wipe off with clean damp cloth.

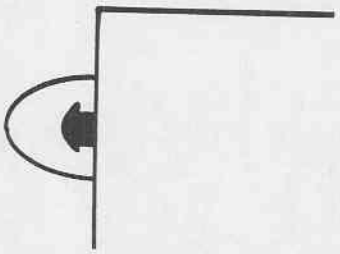
NOTE: Always rub in the direction of polish line for maximum effectiveness.

Always wipe dry to avoid water marks.
NEVER USE STEEL WOOL.

4.4. Troubleshooting Guide
1. Electrical Converter is receiving electrical supply from wall receptacle but is not putting out an electrical supply to tank.
a. Check the circuit breaker indicators. If the circuit breaker is tripped, simply depress in on the circuit breaker indicator. (Figure 4-1).



circuit breaker tripped



circuit breaker normal

Figure 4-1

4.5 Repair Procedure
The Electrical Converter is not field serviceable. The unit must be sent to the factory. For further information, contact Ferno Ille Customer Service at:

Ferno-Washington, Inc.
70 Weil Way
Wilmington, OH 45177-9371
(513) 382-1451
FAX: (513) 382-1191

4.6. Repair Parts
The Electrical Converter has no serviceable parts.

4.7. Supplies
4.7.1 Sanizene (TM) Hard Surface Disinfectant
Sanizene Hard Surface Disinfectant is used on hard non-porous surfaces. Use one ounce of Sanizene

per gallon of water for a minimum contact time of 10 minutes for a single application. Sanizene can be applied with a mop, sponge, or cloth as well as spraying. For best results, mix Sanizene and water together before each cleaning. Use protective glasses and gloves.

Sanizene is sold in unit-dose quart and gallon containers.

CAUTION:

In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. For eyes, call a physician. If swallowed, immediately drink a large quantity of milk, egg whites, gelatin solution, or if these are not available, drink large quantities of water. AVOID ALCOHOL. Get medical attention.

NOTE TO PHYSICIAN
Probable mucousal damage may contraindicate the use of gastric lavage. Measures against circulatory shock, respiratory depression, and convulsion may be needed.

DO NOT MIX WITH ANY OTHER CHEMICAL

4.7.2 Steelscrub (TM)
Steelscrub cleans, bleaches and disinfects in one application. A small amount is used. Rubber gloves are recommended when using Steelscrub. Materials can be absorbed through the skin causing possible kidney damage if in contact with large quantities for extended periods.

Steelscrub is sold in quart and gallon containers.

CAUTION

If Steelscrub enters eyes, flush with water for 15 minutes. If irritation persists, contact physician. If skin contact has occurred during use, rinse thoroughly to avoid absorption. If taken internally, induce vomiting.

Hazardous decomposition products are chlorine and carbon monoxide.

If using large amounts, use protective glasses and gloves.

DO NOT MIX WITH ANY OTHER CHEMICAL.

Sanizene

Health Hazard Data

Threshold Limit Value	Not Applicable
Effects of Overexposure	Eyes—causes eye damage Skin—causes severe skin irritation. Ingestion—harmful or fatal if swallowed.

Emergency and First Aid

Procedures	Eyes—immediately flush eyes with plenty of water for 15 minutes. Call a physician immediately. Skin—immediately flush skin with plenty of water for 15 minutes. Ingestion—drink promptly a large quantity of milk, egg whites, gelatin solution or large quantity of water. Get medical attention.

Reactivity Data

Stable

Incompatibility	Acids
Hazardous Decomposition Products	None
Hazardous Polymerization	Will not occur.

Spill or Leak Procedures

Steps to be Taken	Mop or flush with water. Avoid contamination of food, water or feed.
Waste Disposal Method	If waste cannot be disposed of by use according to label instructions, contact your state pesticide or environmental control agency or the hazardous waste representative at the nearest EPA Regional Office for guidance.

Special Protection Information

Respiratory Protection	None
Ventilation	Not Applicable
Protective Gloves	Wear gloves
Eye Protection	Goggles or face shield.

Precautions

Handling and Storing	Do not contaminate water, food or feed by storage or disposal. Open dumping is prohibited. Do not reuse empty container.

Steelscrub

Health Hazard Data

Threshold Limit Value	Not Applicable
Effects of Overexposure	Can be absorbed through skin, to cause kidney damage (contact with large quantities for extended periods)
Emergency and First Aid Procedures	Get in Eyes: Flush with water for 15 minutes. If irritation persists, contact physician If Contact With Skin: Wash immediately to avoid absorption. If taken internally, induce vomiting.

Reactivity Data

Unstable	Keep away from heat and acids
Incompatibility	Not Applicable
Hazardous Decomposition Products	Chlorine, Carbon Monoxide
Hazardous Polymerization	Will not occur

Spill or Leak Procedures

Steps to Be Taken	If spilled, material may be washed down with water, then absorbed with sweeping compound
Waste Disposal Method	Transport to Landfill

Special Protection Information

Respiratory Protection	Not Applicable
Ventilation	Not Applicable
Protective Gloves	Wear gloves
Eye Protection	Wear Eye Protection

Special Precautions

Handling and Storing	Under normal conditions, product is not hazardous and requires no special handling

Section 5: Warranty

This equipment has been carefully inspected and tested and is fully covered by the Ferno Ille guarantee provided the Warranty Card is mailed within ten days from receipt of product.

Ferno Ille will guarantee all Ferno Ille equipment to be perfect in material and workmanship. We agree to replace free of charge any part that may be found defective if this part is returned to us, transportation charges prepaid, within one year from date of purchase. This service guarantee is not to be construed to cover willful neglect or misuse and does not apply to standard electrical equipment, lamps, bulbs, switches, receptacles, etc.

Ferno Ille cannot assume responsibility for repairs made by others.

FERNO

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Wilmington, OH 45177-9371
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FAX: 513/382-1191

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